Aquatic Species Biological Assessment for Livestock Grazing on the Spring Gulch Allotment

CHALLIS-YANKEE FORK RANGER DISTRICT

SALMON-CHALLIS NATIONAL FOREST

LEMHI COUNTY, IDAHO

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1 INTRODUCTION

The Challis-Yankee Fork Ranger District of the Salmon-Challis National Forest authorizes livestock grazing activities within the Spring Gulch Allotment. This biological assessment describes the proposed action and discusses the probable impacts of that action on listed species and proposed critical habitat that may be affected. This biological assessment forms the basis for any necessary consultation with the Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) (collectively the "Services") pursuant to section 7 of the Endangered Species Act (ESA) of 1973 (as amended) and its implementing regulations. This biological assessment replaces all previous consultations associated with this allotment. The regulations for consultation require the action agency to re-initiate consultation if certain triggers are met (50 CFR 402.16). Occasionally during the implementation of a proposed action, changes in circumstances, situations, or information can raise the question as to whether those re-initiation thresholds have been reached. Should that situation occur, the Salmon-Challis National Forest (SCNF) will assess the changes and any potential impacts to listed species, review the re-initiation triggers, coordinate with Services for advice (if needed), and arrive at a determination whether re-initiation of consultation is necessary.

2 BACKGROUND INFORMATION

The Spring Gulch Allotment is within the Lower Pahsimeroi 5th Field HUC (5th Field HUC: 1706020203) which encompasses roughly the lower third of the Pahsimeroi River basin. Elevations within the sub-watersheds range from 4,649 feet at the confluence of the Pahsimeroi River and the Salmon River to 11,085 feet at the summit of Grouse Creek Mountain. The geology of the sub-watersheds is a mix of sedimentary rock, volcanic rock, and large alluvial deposits. The physiography of the sub-watershed includes high and moderate relief mountains and associated canyons, alluvial fans, floodplains, and a broad valley floor. The primary vegetation types are sagebrush steppe, coniferous forest, deciduous riparian, coniferous riparian, sub-alpine, and alpine communities. The majority of the mountain streams have a snowmelt dominated stream flow pattern with peak flows typically occurring in early summer and low flows occurring during the winter months. The streams on the valley floor are typically spring fed with relatively stable flows throughout the year although flows in the mainstem Pahsimeroi River are influenced by snowmelt from tributary streams. The sub-watershed is a mix of Forest Service, Bureau of Land Management, state, and private lands. Significant management actions within the sub-watershed have included agriculture activities, livestock grazing, stream alteration, stream diversion, road construction, development, fire suppression, the introduction of non-native fish, mining, and recreation.

3 PROPOSED ACTION

3.1 PROJECT AREA

The Spring Gulch Allotment is a 9,189 acre allotment located north of the town of May in the Pahsimeroi River basin (Figures 1 and 2). The allotment is within the Lower Pahsimeroi 5th Field HUC (5th Field HUC: 1706020203) (Figure 3).

Figure 1 – Spring Gulch Allotment Vicinity Map.

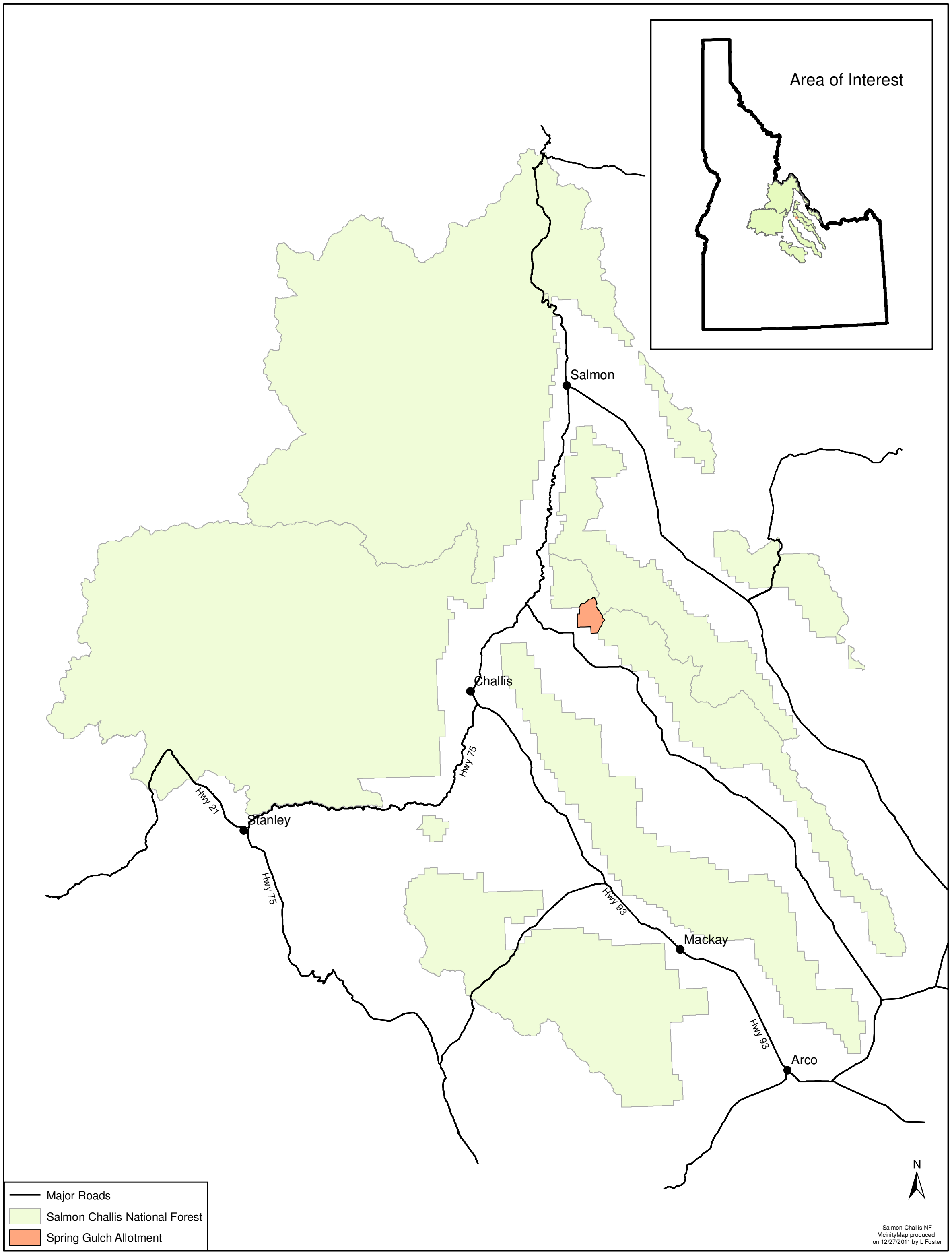


Figure 2 – Spring Gulch Allotment Action Area.

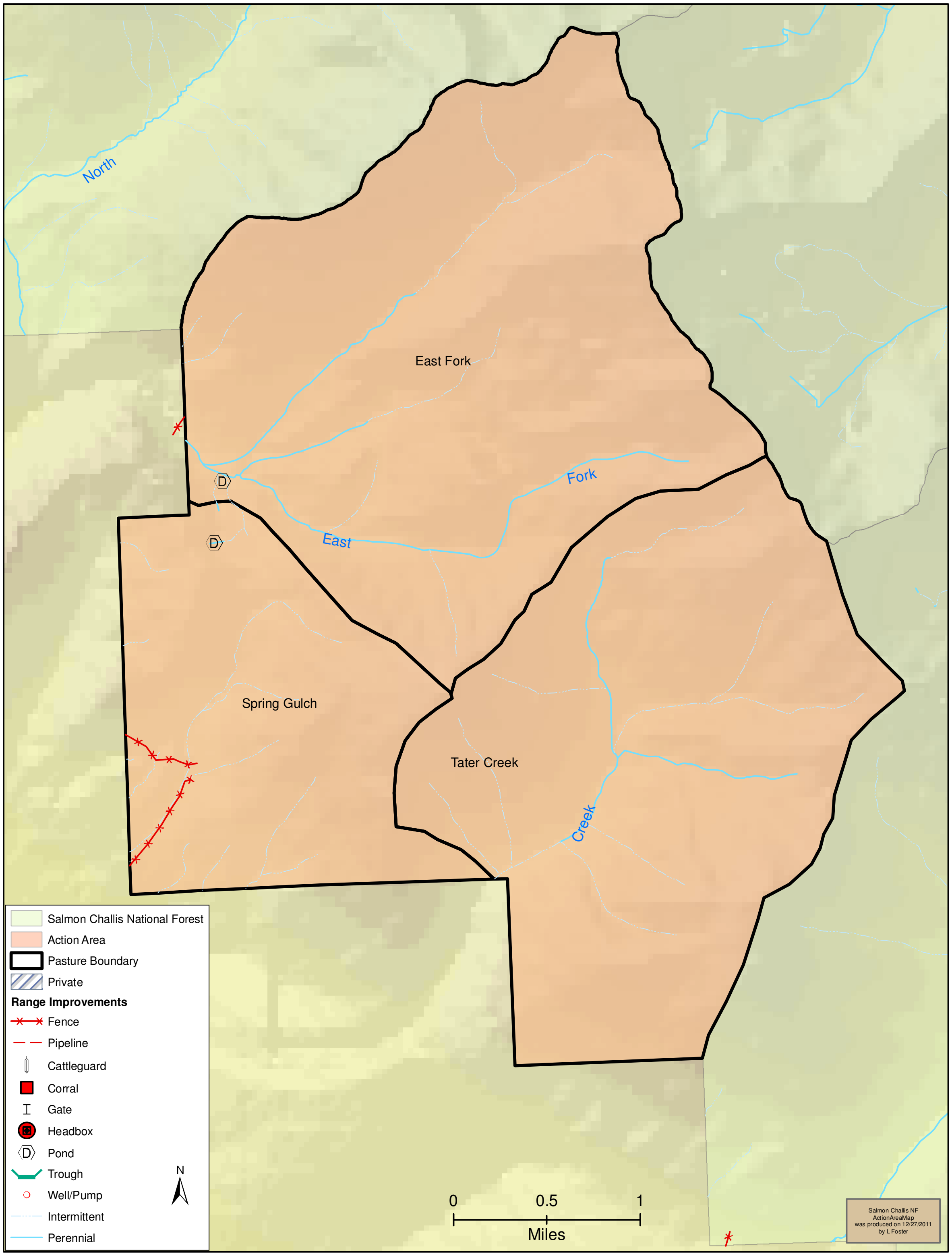
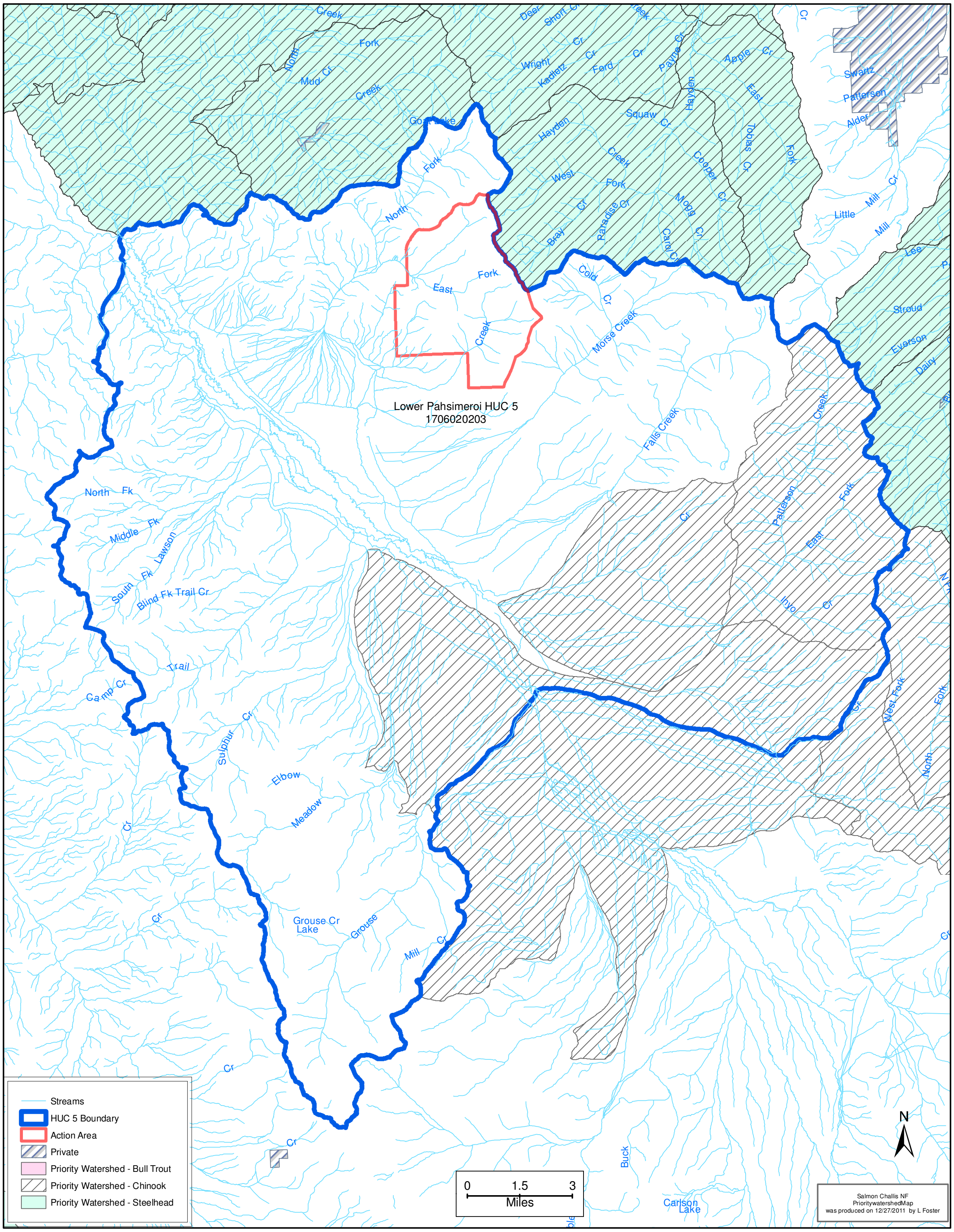


FIGURE 3 – SPRING GULCH ALLOTMENT HUCS AND PRIORITY WATERSHEDS.



3.2 PROPOSED ACTION

3.2.1 CURRENT PERMIT

The grazing permit for this allotment is permit #20029 which expires on December 31, 2015. It permits 90 cow/calf pairs to graze between July 16 and August 31. Total Head Months permitted on the allotment is 139.

3.2.2 GRAZING SYSTEM

Grazing on this allotment will involve grazing up to 90 cow/calf pairs under a two pasture rotation system with grazing occurring anytime between July 6 and August 31. The allotment consists of the Spring Gulch, East Fork, and Tater Creek units. The East Fork Unit will be grazed first following which livestock will move to the Spring Gulch Unit. No livestock will be allowed in the East Fork Unit after August 15 and all livestock will be removed from the allotment by August 31. Livestock grazing is not being planned for the Tater Creek Unit although it is possible that a few cattle will drift into the unit and that some incidental grazing will occur in the unit.

Entry: Livestock enter the allotment from an adjacent BLM allotment.
Exit: Livestock exit the allotment to an adjacent BLM allotment.

TABLE 1. GENERAL ROTATION SCHEDULE.

All Years
East Fork[1]
Spring Gulch

[1] Livestock will not be in this unit after August 15

The distribution of ESA listed fish populations and designated critical habitat within the various pastures are as follows:

East Fork Unit:

Bull Trout: Occupied, spawning, and designated critical habitat.
Steelhead: No occupied, spawning, or designated critical habitat.
Chinook salmon: No occupied, spawning, or designated critical habitat.

Tater Creek Unit:

Bull Trout: No occupied or spawning habitat but does contain designated critical habitat.
Steelhead: No occupied, spawning, or designated critical habitat.
Chinook salmon: No occupied, spawning, or designated critical habitat.

Spring Gulch Unit: No ESA listed fish populations or designated critical habitat.

3.2.3 RESOURCE OBJECTIVES

Resource Objectives and Effectiveness Monitoring: The allotment is being managed to achieve specific resource conditions in riparian areas. Resource objectives are the Forest's description of the desired land, plant, and water resources condition within riparian areas in the allotment. Some resource objectives are Riparian Management Objectives (RMOs) that were implemented as part of the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH) and the consultation associated with that strategy (USDA Forest Service and USDI Bureau of Land Management 1995). PACFISH is an interim strategy for managing anadromous fish-producing watersheds that was amended into the Salmon and Challis Forest Plans in 1995 and applies to national forest lands in the Salmon River basin. PACFISH established riparian management objectives, standards and guidelines, and monitoring direction that the forest is required to follow.

Effectiveness monitoring for resource objectives will be monitored every five to ten years at Designated Monitoring Areas (DMAs) using the Multiple Indicator Monitoring (MIM) technical reference or other best available science as it becomes available. DMAs are areas representative of grazing use specific to the riparian area being accessed and reflect what is happening in the overall riparian area as a result of on-the-ground management actions. They should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream (Burton et al 2008). Results from monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

The resource objectives for this allotment, which is not within a PACFISH priority watershed, are as follows:

Greenline Successional Status: A greenline successional status value of at least 61 (late seral) or the current value, whichever is greatest (Winward 2000, Burton et al. 2008)
Woody Species Regeneration: Sufficient woody recruitment to develop and maintain healthy woody plant populations (Winward 2000, Burton et al. 2008)
Bank Stability RMO (PACFISH): A bank stability of at least 80% or the current value, whichever is greatest.
Water Temperature RMO (PACFISH): No measureable increase in maximum temperature.[1] For steelhead and Chinook salmon, <64°F in migration and rearing areas and <60°F in spawning areas. For bull trout, maximum water temperatures below 59°F within adult holding habitat and below 48°F within spawning and rearing habitats.[2]
Width:Depth Ratio RMO (PACFISH): <10 or by channel type as follows[3]:

- A Channel: 21
- B Channel: 27
- C Channel: 28

Sediment RMO (PACFISH): None required by PACFISH, but see land resource management plan below.

3.2.4 MANGEMENT STANDARDS AND GUIDELINES

The following are forest plan standards and guidelines that apply to the management of livestock grazing relative to listed fish and their habitats:

PACFISH

- GM-1 - Modify grazing practices (e.g., accessibility of riparian area to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect listed anadromous fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives and avoiding adverse effects on listed anadromous fish.

  The PACFISH environmental assessment defines “Adverse Effects” to include “…short or long-term, direct or indirect management-related, impacts of an individual or cumulative nature, such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical

[1] In this case, maximum water temperature is expressed as the 7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period.
[2] This standard was established by INFISH and is being applied to areas occupied by bull trout within the area covered by PACFISH.
[3] These values are based on the mean values observed for streams in natural condition within the Salmon River (Overton et al. 1995)

disturbance of redds, reduced reproduction success, delayed or premature migration, or other adverse behavioral changes to listed anadromous salmonids at any life stage."

- GM-2 – Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish. Relocate or close facilities where these objectives cannot be met.

- GM-3 – Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that will not retard or prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish.

Land Resource Management Plan for the Challis National Forest – Forest Wide Direction

- Protect anadromous fish spawning areas from disturbance by livestock and other activities.
- Utilize grazing systems on allotments which provide for deferment or rest whenever possible. Season-long grazing or common use will be allowed only where resources can sustain such use.
- Range improvements will be maintained annually by permittees to standards adequate for public safety and established use, and control and proper distribution of livestock. Maintenance will be completed before livestock are allowed on the allotment.
- Rehabilitate existing stock driveways where damage is occurring. Relocate them outside riparian areas if possible.
- Browse utilization within the riparian ecosystem will not exceed 50 percent of new leader production.
- Ensure that all management-induced activities meet State water quality standards, and Forest water quality goals, including sediment constraints.
- Impacts of activities may not increase fine sediment by depth (within critical reaches) of perennial streams by more than 2 percent over existing levels. Where existing levels are at 30% or above new activities that would create additional stream sedimentation would not be allowed. If these levels are reached or exceeded, activities that are contributing sediment will be evaluated and appropriate action will be taken to bring fine sediment within threshold levels.
- Retain at a minimum, 75 percent of natural stream shade provided by woody vegetation.
- Establish forage utilization at levels which will yield 90% inherent bank stability or trends toward 90% where streams or other water bodies are involved.
- Discourage livestock concentrations in riparian areas and within 100 feet of lakes and perennial streams. Restrict livestock grazing in identified problem areas where necessary.
- Livestock driveways and trailing areas will be located away from riparian or streamside areas.

Land Resource Management Plan for the Challis National Forest – Management Area Specific Direction

- None

3.2.5 USE INDICATORS

Annual use indicators are used to ensure that grazing does not prevent the attainment of the resource objectives. Riparian annual use indicators used on the Salmon-Challis National Forest generally include greenline stubble height, bank alteration, and woody browse. In general, greenline stubble height is used to regulate grazing impacts on greenline ecological status, bank alteration is used to regulate grazing impacts on bank stability, and woody browse is used to regulate impacts on woody recruitment. The specific indicators selected for a specific unit should be those that correspond with the riparian resources that are most sensitive to the impacts of livestock grazing. For example, if bank stability was the riparian feature most likely to be impacted by livestock grazing in a unit, then bank alteration would be selected as the annual use indicator for that unit.

Based on the guidelines in section 3.7, available data, and professional experience, the various indicators for this allotment have been established (Table 2). Within the Spring Gulch Unit, perennial water is limited and there are no significant perennial streams. Therefore, riparian indicators are not being established for that unit.

TABLE 2. THE ANNUAL USE INDICATORS.

Unit	End of Season Indicators			
	Median Greenline Stubble Height	**Bank Alteration**	**Woody Browse**	**Upland Utilization**
East Fork	≥ 6 inches	10%	Single-stemmed: 30% Multi-stemmed: 50%	≤ 50%
Tater	None[1]	None[1]	None[1]	None[1]
Spring Gulch	None[2]	None[2]	None[2]	≤ 50%

[1] Livestock grazing is not being planned for the Tater Creek Unit although it is possible that a few cattle will drift into the unit and that some incidental grazing will occur in the unit. Since livestock grazing within this unit will be limited to incidental use no indicators are being established for the unit.
[2] Perennial water within this unit is limited and there are no significant perennial streams. Therefore, no riparian end of season indicators will be used in this unit.

Annual use indicators will be measured at key areas by key species (on uplands) and at DMA greenlines annually. Key areas are monitoring sites chosen to reflect the effects of grazing over a larger area (Burton et al 2008). Key species are preferred by livestock and an important component of a plant community, serving as an indicator of change (Utilization Studies and Residual Measurements, Interagency Technical Reference 1734-3). The Interagency Technical Reference or other best available science would be used to monitor grazing use. The MIM Interagency Technical Bulletin (Burton et al 2008) or other best available science would be used to monitor grazing use at DMAs. Annual use indicators will be monitored by the Forest Service. Triggers will be used by permittees as a tool to help ensure annual use indicators are met. Results from monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

3.3 IMPROVEMENTS

Existing Improvements: The allotment contains numerous existing improvements including fences and ponds (Figure 2). These will be maintained in accordance with the term grazing permit.

New Improvements: No improvements are proposed as part of this consultation.

Potential Future Improvement: The temporary electric fence between the Spring Gulch and East Fork units may be replaced in the future with a permanent fence.

3.4 CHANGES FROM EXISTING MANAGEMENT

Prior to 2010, the Spring Gulch and East Fork units were actively grazed while the Tater Creek Unit likely received only incidental use. Beginning in 2010, the Forest discontinued livestock grazing in the East Fork to protect and restore bull trout habitat. At that same time, the Forest formally discontinued livestock grazing in the Tater Creek Unit because livestock were very rarely in the unit. Since livestock were no longer grazing those portions of the allotment with listed fish or designated critical habitat the biological assessment that was completed in June 2010 resulted in a "NO EFFECT" determination for all listed fish and designated critical habitat. The permittee has now indicated that he would like to graze in the East Fork Unit and have the option of at least incidentally grazing the Tater Creek Unit. The current proposed action, which will begin being implemented in 2012, allows for grazing in Spring Gulch and East Fork units and incidental grazing in the Tater Creek Unit.

3.5 CONSERVATION MEASURES

The following conservation measures will be implemented as part of the proposed action and incorporated into the term grazing permits to avoid and reduce potential impacts to ESA listed fish:

- Livestock will not graze in the East Fork Unit during the bull trout spawning and incubation period

3.6 MONITORING

Implementation and effectiveness monitoring will be conducted at designated monitoring areas (DMA's). Each DMA will be located in an area that is representative of grazing use and reflect what is happening in the overall riparian area as a result of grazing activity. The DMA should reflect typical livestock use where they enter and use vegetation in riparian areas immediately adjacent to the stream. Monitoring at the DMA will be completed using the MIM Interagency Technical Bulletin (Burton et al. 2008) or other best available science. Results from monitoring will be available at (http://www.fs.fed.us/r4/sc/projects/range/index.shtml).

<u>Implementation Monitoring</u>: Implementation monitoring will vary across the allotment and the specific implementation monitoring for each unit is described below:

> East Fork Unit: A DMA has been established in this unit. The designated indicators (e.g. - stubble height, bank alteration, and woody browse) will be periodically monitored while livestock are in the unit to evaluate the status of the indicators and to determine when livestock need to be moved from the unit. Triggers will be used by permittees as a tool to determine when livestock need to be moved from a unit. The value of the trigger is determined by estimating how much time will be needed to move livestock from the unit before the end of season annual indicator value is met. This value will vary from year to year and unit to unit and should be customized to the specific circumstances of each unit. The designated indicators will be monitored at the end of the grazing season to ensure that the indicators have been met.

> Tater Creek Unit: A DMA has not been established in this unit. <u>A DMA will be established in this unit in 2012</u>. Livestock grazing is not being planned for the Tater Creek Unit although some incidental use may occur within the unit. Therefore, livestock will likely have little or no impact on greenline stubble height, bank alteration, or woody browse in this unit. The Tater Creek Unit will be checked annually to determine if livestock have been in the unit. If livestock were in the unit, an ocular evaluation will be made at the DMA to ensure that livestock use was no more than incidental. This monitoring will be documented with photographs. If livestock use is more than incidental, monitoring will proceed in the manner described for the East Fork Unit. If livestock use along this stream is more than incidental for more than one year in any four year period, the management of the unit will be reevaluated and if necessary, the Forest will reinitiate consultation.

> Spring Gulch Unit: Perennial water within this unit is limited and there are no fish or designated critical habitat within the unit. Therefore, there will be no implementation monitoring within this unit associated with this biological assessment.

<u>Effectiveness Monitoring</u>: Effectiveness monitoring will vary across the allotment and the specific effectiveness monitoring for each unit is described below:

> East Fork Unit: Greenline successional status, bank stability, and woody recruitment will be monitored at the DMA every three to five years to evaluate resource conditions

> Tater Creek Unit: A DMA has not been established in this unit. <u>A DMA will be established in this unit in 2012 and resource objective data (e.g. - greenline successional status, bank stability, and woody recruitment) will be collected from the DMA</u>. In the future, the condition of the resource objectives are required to be monitored at the DMA only if livestock use along this stream is more than incidental for more than one year in any four year period.

Spring Gulch Unit: Perennial water within this unit is limited and there are no fish or designated critical habitat within the unit. Therefore, there will be no effectiveness monitoring within this unit associated with this biological assessment.

3.7 INTERDEPENDENT ACTIONS

Interdependent actions are actions that "no independent utility apart from the action under consideration" (50 CFR§402.02). The Forest has not identified any interdependent actions associated with the proposed action. There are activities associated with the proposed action that could potentially affect fish and could be considered interdependent actions. These include livestock grazing on the adjacent BLM allotment, grazing and other agriculture activities on private property that is owned by the permittees and diverting water from streams on private and national forest lands for agricultural purposes. However, we believe that these activities would continue to occur in a manner similar to the way they are currently occurring whether or not livestock graze on this allotment. Therefore, these activities will not be considered as interdependent actions.

3.8 INTERRELATED ACTIONS

Interrelated actions are actions that "are part of a larger action and depend on the larger action for their justification" (50 CFR§402.02). The Forest has not identified any interrelated actions associated with the proposed action.

3.9 ADAPTIVE MANAGEMENT

The adaptive management strategy described below and depicted in Appendix F diagrams 1.0 (long-term and 2.0 (Annual) is intended for allotments requiring consultation. It will be used to ensure: 1) sites at desired condition remain in desired condition; 2) sites not in desired condition have an upward trend or an acceptable static trend to be agreed upon with the Services and the Forest Service; and 3) direction from consultation with the Services is met. The overall strategy consists of a long-term adaptive management strategy and an annual adaptive management strategy. The long-term strategy describes how adaptive management will be used to ensure the resource objectives previously stated are achieved and to maintain consistency with Forest Plan level direction. The annual adaptive management strategy describes how adjustments will be made within the grazing season to ensure annual use indicators and other direction from consultation is met. Both strategies describe when and how regulatory agencies will be contacted in the event direction from consultation is not going to be met.

Ideally, the value associated with the annual use indicator is customized to the specific circumstances in each unit and is based on data and experience. However, customizing this value generally requires a significant amount of data and/or experience with a particular unit. When sufficient data and/or experience are not available to establish the annual use indicators values, the forest has provided default recommendations for establishing the values. These recommendations will be used until such time as sufficient data and/or experience are available to customize the annual indicator values. The recommendations that apply to this allotment are:

- Livestock grazing in the uplands and riparian areas will be limited to 50% use on key herbaceous species within key areas of the allotment during the grazing season.
- When the relevant resource objectives are being met (section 3.2.5) annual use indicators, within riparian areas will be 50% browse on multi-stemmed species, 30% browse on single-stemmed species, and 4" residual stubble height.
- When the relevant resource objectives (see section 3.2.5) are not being met annual endpoint indicators, allowable use, will be 30% browse on multi-stemmed species, 20% browse on single-stemmed species, and 6" residual stubble height.
- When bank stability is 80% or greater the bank alteration annual use indicator will be 20%
- When bank stability is 60-79% the bank alteration annual use indicator will be 10-20%
- When bank stability is less than 60% the bank alteration annual use indicator will be 10%

4 ESA ACTION AREA DESCRIPTION

The ESA action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR§402.02). This is the area where the action and any interdependent and interrelated actions will result in direct or indirect affects to listed species or designated critical habitat. Our analysis indicates that the proposed action has the potential to generate direct or indirect affects to aquatic species and aquatic habitats in the area covered by the allotment (Figure 2). Therefore, the action area is the Spring Gulch Allotment.

Priority Watersheds are those watersheds that have been identified per direction in the 1995 PACFISH Biological Opinion, that require a different management strategy because of their importance to listed fish. None of the action area is within a priority watershed (Figure 3).

5 LISTED SPECIES REVIEW

5.1 SPECIES OCCURRENCE

The current species lists issued by the U.S. Fish and Wildlife Service (last updated December 13, 2010) and by the National Oceanic and Atmospheric Administration (last updated January 25, 2011) identifies four ESA listed fish species as occurring on and adjacent to the Salmon-Challis National Forest. These are:

- Snake River Sockeye Salmon (Endangered) (Federal Register 56FR58619)
- Snake River Spring/Summer Chinook Salmon (Threatened) (Federal Register 57FR14653)
- Snake River Steelhead (Threatened) (Federal Register 62FR43937)
- Bull Trout (Threatened) (Federal Register 63FR31647)

Each of these species are discussed below.

5.1.1 SOCKEYE SALMON

Sockeye salmon, which use the mainstem Salmon River to move between the Pacific Ocean and lakes in Stanley Basin, are not present in the action area.

5.1.2 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

Sampling completed by the Forest Service (Salmon-Challis National Forest, unpublished data; Bartel et al. 2009) indicates that Chinook salmon are not present within the action area.

5.1.3 SNAKE RIVER BASIN STEELHEAD

Sampling completed by the Forest Service (Salmon-Challis National Forest, unpublished data; Bartel et al. 2009) indicates that steelhead are not present within the action area.

5.1.4 COLUMBIA RIVER BULL TROUT

Bull trout are present in two streams within the action area. Sampling completed by the Forest Service (Salmon-Challis National Forest, unpublished data; Bartel et al. 2009) indicates that within the action area bull trout are present within East Fork Little Morgan Creek and an unnamed tributary to East Fork Little Morgan Creek (Figure 4, Table C1, Table C2, Table C3).

Although bull trout are found in Tater Creek below the Forest boundary, they are not present in Tater Creek within the action area. That portion of Tater Creek within the action area is completely isolated from that portion of Tater Creek below the Forest boundary. Tater Creek originates at a series of springs within the action area and flows down the drainage towards the Pahsimeroi valley. However, beginning at a point approximately 0.3 miles above the Forest boundary and extending downstream to a point approximately 0.2 miles below the Forest boundary there are several large talus slides that extend into the bottom of the canyon. These talus slides are so large that they cover the bottom of the canyon and prevent the stream from flowing above the ground down the drainage (Figure 5, Figure 6). In some places, there is no evidence of a stream channel across the slides. At a point approximately 0.3 miles below the Forest boundary, Tater Creek emerges from the ground after which it flows continuously out of the canyon and onto an alluvial fan.

Bull trout occur in that portion of Tater Creek below the Forest boundary (Salmon-Challis National Forest, unpublished data). There also appears to be suitable fish habitat in Tater Creek in the action area above the talus slides (Figure 7, Figure 8). However, two sections of Tater Creek above these slides were electrofished in 2010 and no fish were found (Salmon-Challis National Forest, unpublished data) (Table C1).

5.2 CRITICAL HABITAT

5.2.1 SOCKEYE SALMON

Critical habitat has been designated for Snake River sockeye salmon (Federal Register 58FR68543). The action area does not contain any sockeye salmon designated critical habitat.

5.2.2 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

Critical habitat has been designated for Snake River spring/summer Chinook salmon and includes “river reaches presently or historically accessible…to Snake River spring/summer Chinook salmon” (Federal Register 58FR68543). The Salmon-Challis National Forest has delineated Chinook salmon critical habitat within streams on national forest lands following the process identified in Appendix D. There are no streams within the action area that are presently or historically accessible to Chinook salmon. Therefore, there is no Chinook salmon designated critical habitat within the action area.

5.2.3 SNAKE RIVER BASIN STEELHEAD

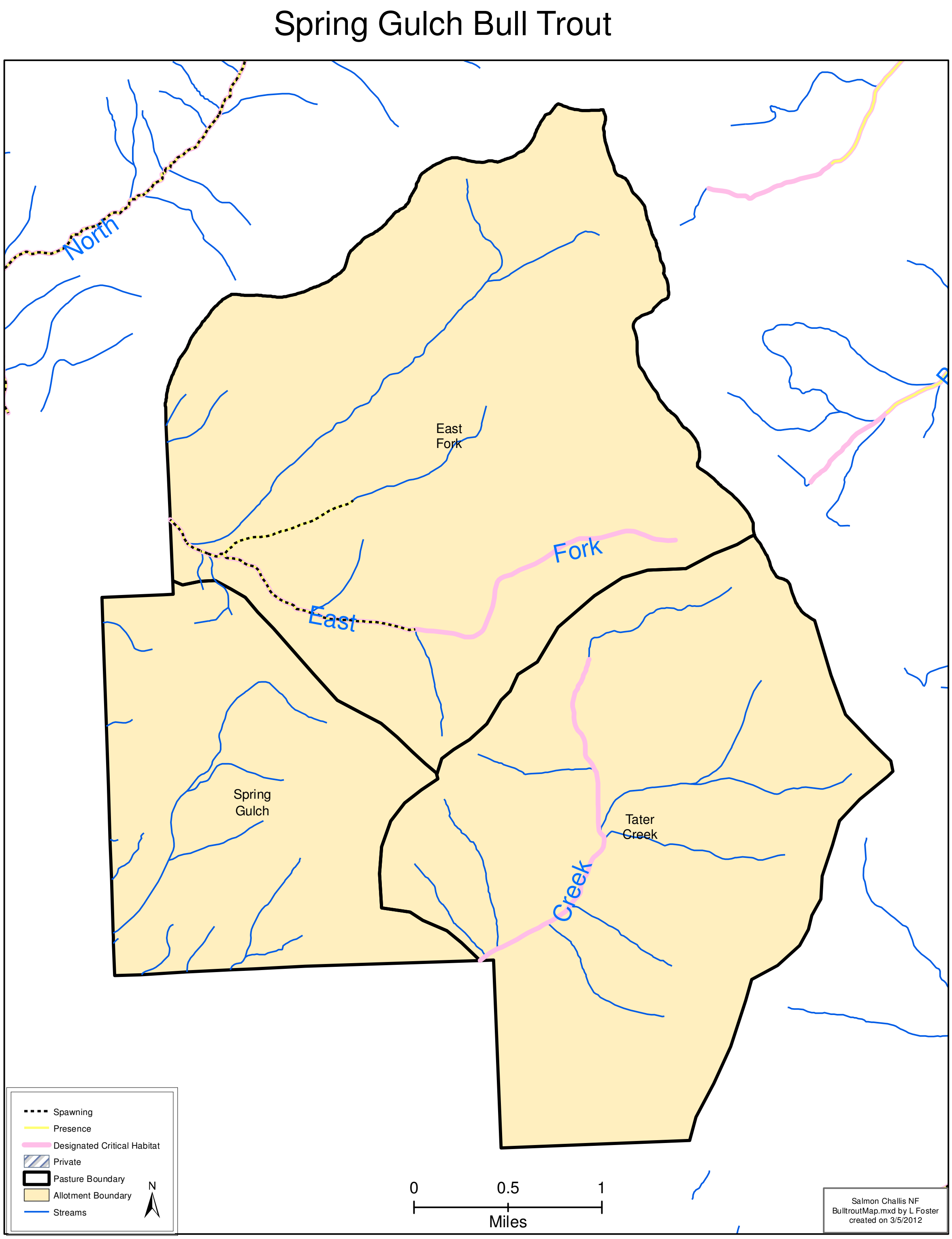
Critical habitat has been designated for Snake River Basin steelhead (Federal Register 70FR52630). There is no steelhead designated critical habitat within the action area.

5.2.4 COLUMBIA RIVER BULL TROUT

Critical habitat has been designated for bull trout (Federal Register 75FR63898). There are 5.21 miles of bull trout designated critical habitat within the action area (Figure 4, Table C2, Table C3). This includes 3.21 miles of East Fork Morgan Creek and 2.00 miles of Tater Creek. As discussed above, that portion of Tater Creek within the action area is completely isolated from that portion of Tater Creek below the action area.

The Forest desires to assess the potential impact to the Primary Constituent Elements (PCEs) of designated bull trout critical habitat defined on page 2360 of the referenced Federal Register notice. The Forest would like to demonstrate that potential impacts to the PCEs have been assessed and considered where bull trout are present in the proposed action area (Appendix E).

FIGURE 4 – BULL TROUT OCCURRENCE, SPAWNING, AND PROPOSED CRITICAL HABITAT ON THE SPRING GULCH ALLOTMENT.



6 ENVIRONMENTAL BASELINE DESCRIPTION

The action area is within the Morgan Creek 6th Field HUC (6th Field HUC: 070602020313)[4], Tater Creek 6th Field HUC (6th Field HUC: 070602020311)[4], and Pahsimeroi-Lower Patterson Creek 6th Field HUC (6th Field HUC:070602020305). The Baseline Matrices of Diagnostic Pathways and Indicators for the Morgan Creek 6th Field HUC is provided in Appendix B. That portion of the action area within the Pahsimeroi-Lower Patterson Creek 6th Field HUC does not contain any aquatic habitat. Additionally, the proposed action is not expected to impact fish or aquatic habitat in the Tater Creek 6th Field HUC. Therefore, baseline matrices for these two sub-watersheds are not included in this biological assessment.

Below is a general summary of baseline conditions within the action area. While the baseline matrix included in Appendix B reflects aquatic/riparian condition and trend at the watershed scale, the baseline descriptions provided below focus only on baseline conditions within the action area. This is done to focus analysis emphasis on those habitat parameters most likely to be influenced by grazing activities and set the context for analyzing the effects of the proposed action on these conditions. As these characterizations reflect the more localized site-specific conditions of the action area, identified condition and/or functionality assessments may vary from those identified for the larger watershed-scale baseline (Appendix B).

6.1 GENERAL DESCRIPTION OF LISTED FISH POPULATIONS

This section provides a general description of the distribution, status, and trend of listed fish populations within the action area. As previously discussed, sockeye salmon, Chinook salmon, and steelhead do not occur within the action area. Bull trout are present in two streams within the action area. Sampling completed by the Forest Service (Salmon-Challis National Forest, unpublished data; Bartel et al. 2009) indicates that within the action area bull trout are present within East Fork Little Morgan Creek and an unnamed tributary to East Fork Little Morgan Creek (Figure 4, Table C1, Table C2, Table C3). Bull trout densities within these two streams are relatively high (Table C1) but trend data are not available. The presence of small bull trout suggest that bull trout spawn in both of these streams.

6.2 GENERAL DESCRIPTION OF HABITAT CONDITIONS

This section provides a general description of the status and trend of fish habitat within the action area. More specific information on habitat conditions is provided later in this section and in Appendices B and C.

Fish habitat within the East Fork Unit is generally in excellent condition (B. Gamett, personal observation; Salmon-Challis National Forest, unpublished data). There are some relatively small portions of the unit where livestock grazing may have impacted the stream.

Little information is available relating to habitat in the Tater Creek Unit. In 2000, a large wildfire burned most of the Tater Creek drainage within the action area and this fire significantly modified the riparian vegetation along Tater Creek (Figure 11). However, visual observations within this unit during 2010 indicate that stream and riparian habitat conditions were within natural levels given that a wildfire has recently burned through the area (C. Wood, personal observation). Since there has been little to no grazing in this unit in the last several years, livestock grazing has likely not impacted stream and riparian habitat conditions within this unit.

6.3 MAJOR LIMITING FACTORS

[4] The baseline matrix is generally generated at a 5th field HUC level. However, the Lower Pahsimeroi watershed (5th Field HUC: 1706020203) is not a true watershed and the main stem Pahsimeroi River flows through the middle of the watershed. Therefore, something occurring in one part of the watershed may have little, if any impact in another part of the watershed. For this reason, this baseline matrix is being generated at the 6th field HUC level.

This section provides a general description of the major anthropogenic factors impacting listed fish and listed fish habitat in the action area. Livestock grazing is the only anthropogenic factor with the potential to significantly impact fish and fish habitat within the action area. With the exception of some minor amounts of unauthorized use in the East Fork Unit in 2010 (Salmon-Challis National Forest, unpublished data), livestock grazing has not impacted fish or fish habitat on this allotment since 2009 because livestock grazing has not been authorized in units containing fish and fish habitat since that time.

6.4 GRAZING FOCUS INDICATORS

A Framework to assist in Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Subpopulation Watershed Scale is a tool that was developed to assist in describing the condition of watersheds and streams which listed Chinook salmon, steelhead, and bull trout depend on (Appendix 9 in Lee et al., 1997). It is commonly referred to as the Matrix of Pathways and Indicators, and at its most basic level, is a table which identifies the important elements or indicators of listed salmonid habitat. This table assists biologists to consistently organize and assess current conditions and evaluate how those indicators may be impacted by a proposed action (Lee et al. 1997). The Forest has included a matrix for this allotment in Appendix B. Because the Matrix of Pathways and Indicators was developed to operate at several spatial scales (Lee et al. 1997) the Forest has selected six indicators from the matrix table as their “focus indicators” and the analysis of livestock impacts to fish and designated habitat will be based on these focus indicators. The focus indicators are 1) spawning and incubation, 2) temperature, 3) sediment, 4) width: depth ratio, 5) streambank condition, and 6) riparian conservation areas. These are the indicators that the Forest can easily monitor, have the most specificity with a long running data sets, and most closely reflect the aquatic/riparian baseline pathway and indicator elements considered most likely to be impacted by grazing activities within a watershed.

The Forest has utilized this “Focus Indicator” set to characterize the condition of the habitat for listed fish species in the occupied streams in this allotment. If stream specific information is not available, then observational information or information from similar streams was used. If one (or several) of the focus indicators showed a habitat condition was potentially limiting the ability of listed fish species to thrive; the Forest presented an opinion of the most likely causal factor for that limiting condition. By identifying those potentially limiting factors, the Forest and the Service can focus their analysis on the specific indicators.

These indicators encompass the recently published proposed bull trout critical habitat, and therefore our analysis of these elements will serve as an analysis of impacts to designated and proposed critical habitat.

A description of the condition of the Focus Indicators within the action area is provided below.

6.4.1 SPAWNING AND INCUBATION:

Bull trout spawn within the East Fork Unit (Figure 4, Table C2, Table C3). Available data indicates that bull trout potentially spawn within 2.3 miles of stream within the East Fork Unit. This includes 1.54 miles in East Fork Morgan Creek and 0.76 miles in an unnamed tributary to the East Fork Morgan Creek. Specific data on bull trout spawning periods are not available for this allotment. However, the Salmon-Challis National Forest has established August 15 as the date on which bull trout may begin spawning when site specific information is not available.

6.4.2 WATER TEMPERATURE

The resource objective for water temperature for bull trout is to have a maximum water temperature, as expressed by the 7-day moving average of daily maximum temperatures (7DMMAX), below 15°C within adult holding habitat and below 8.9°C within spawning and rearing habitat. All areas occupied by bull trout within the action area are considered to be spawning and rearing habitat.

Water temperatures appear to meet resource objectives in East Fork Morgan Creek (Figure C1, Table C6). In 2009, the 7DMMAX was 8.7°C in East Fork Morgan Creek near the Forest boundary.

Stream temperature data are not available from the Tater Creek Unit. Since there has been little to no grazing in this unit in the last several years, livestock grazing has likely not impacted stream temperatures within this unit.

6.4.3 SEDIMENT

The action area is not within a priority watershed. Therefore, PACFISH did not establish a resource objective for sediment within the action area. However, the Land Resource Management Plan for the Challis National Forest states the following:

> Impacts of activities may not increase fine sediment by depth (within critical reaches) of perennial streams by more than 2 percent over existing levels. Where existing levels are at 30% or above new activities that would create additional stream sedimentation would not be allowed. If these levels are reached or exceeded, activities that are contributing sediment will be evaluated and appropriate action will be taken to bring fine sediment within threshold levels.

Sediment data are not available for any streams within the action area. Since there has been little to no grazing in the Tater Creek Unit in the last several years, livestock grazing has likely not impacted sediment within this unit.

6.4.4 WIDTH: DEPTH RATIO

The resource objective for width:depth is to have a width:depth ratio of less than 21 in A channel types, 27 in B channel types, and 28 in C channel types. Width:depth data are available from one location on the allotment. In 2009, the Forest Service evaluated the width:depth ratio on East Fork Morgan Creek using the MIM protocol (Figure C1, Table C8). The width:depth ratio was 11.7.

Width:depth ratio data have not been collected from the Tater Creek Unit using the MIM protocol. However, visual observations made on the allotment in 2010 indicate that width:depth ratios on Tater Creek are probably within natural levels (C. Wood, personal observation). Since there has been little to no grazing in this unit in the last several years, livestock grazing has likely not impacted width:depth ratios within this unit.

6.4.5 STREAMBANK CONDITION

The analysis of streambank condition focuses on streambank stability. The resource objective for bank stability is to have bank stability of 80% or greater. In 2009, the Forest Service evaluated bank stability in East Fork Morgan Creek using the MIM protocol and found that bank stability was 6% (Figure 12, Figure C1, Table C8).

Stream and riparian habitat conditions were further reviewed in the East Fork Unit in 2010 (B. Gamett, personal observation). It was found that most of the riparian areas within this unit are dominated by dense vegetation consisting of coniferous trees, deciduous trees, and deciduous shrubs (Figure 9). This vegetation limits livestock access to the streams which limits the ability of livestock to impact the stream including bank stability. It appears that bank stability in these areas is at appropriate levels. However, there are a few areas within this unit where livestock can readily access the stream (Figure 10). While these areas are not representative of riparian conditions across the allotment they are “critical areas” because livestock tend to concentrate in these locations and can have significant impacts to them. The bank stability data referenced above were taken from a site located in one of these areas (Figure 11). Subsequently, the bank stability reported from this site is not representative of bank stability in the entire unit. Furthermore, a portion of the channel at this site has shifted to a new location which is further contributing to the low bank stability observed at this site. While it is likely that historic livestock grazing has impacted bank stability to some extent in this area, livestock grazing does not appear to not be the reason for the low bank stability reported at this site (B. Gamett, personal observation). Furthermore, the lack of livestock grazing since 2009 has likely allowed these areas to begin recovering from any impacts associated with livestock grazing.

Bank stability data have not been collected from the Tater Creek Unit using the MIM protocol. However, visual observations within this unit during 2010 indicate that bank stability is probably within natural levels given that a wildfire has recently burned through the area (C. Wood, personal observation). Since there has been little to no grazing in this unit in the last several years, livestock grazing has likely not impacted streambank condition within this unit.

6.4.6 RIPARIAN CONSERVATION AREAS

The analysis of riparian conservation areas focuses on greenline ecological status and woody species recruitment. The resource objective for greenline ecological status is to have a greenline ecological status of 61 or greater. In 2009, the Forest Service evaluated greenline ecological status in East Fork Morgan Creek using the MIM protocol and greenline ecological status was 24 (Figure 12, Figure C1, Table C8).

Stream and riparian habitat conditions were further reviewed in the East Fork Unit in 2010 (B. Gamett, personal observation). It was found that most of the riparian areas within this unit are dominated by dense vegetation consisting of coniferous trees, deciduous trees, and deciduous shrubs (Figure 4). It appears that greenline ecological status in these areas is at appropriate levels. However, there are a few areas within this unit where livestock can readily access the stream (Figure 5). While these areas are not representative of riparian conditions across the allotment they are “critical areas” because livestock tend to concentrate in these locations and can have significant impacts to them. The greenline ecological status data referenced above were taken from a site located in one of these areas and is not representative of greenline ecological status in the entire unit. Historic livestock grazing has likely impacted greenline ecological status in these critical areas. However, the lack of livestock grazing since 2009 has likely allowed these areas to begin recovering from any impacts associated with livestock grazing.

The resource objective for woody recruitment is to develop and maintain healthy woody plant populations. This objective can be evaluated by examining the total density of woody species, the density of seedlings and young, and the percentage of woody plants that are seedlings and young. In 2009, the Forest Service evaluated woody recruitment in East Fork Morgan Creek using the MIM protocol (Figure C1, Table C8). Total woody species density was 2,909 plants/acre, the density of seedlings and young was 885 plants/acre, and seedlings and young comprised 29% of the total woody population. A review of the unit in 2010 indicated that most of the riparian areas within this unit are dominated by dense vegetation consisting of coniferous trees, deciduous trees, and deciduous shrubs (Figure 4). These values and observations indicate that woody species recruitment within this unit is sufficient to develop and maintain healthy woody plant populations.

Greenline ecological status and woody recruitment have not been evaluated in the Tater Creek Unit using the MIM protocol. In 2000, a large wildfire burned most of the Tater Creek drainage within the action area. This fire significantly modified the riparian vegetation along Tater Creek (Figure 11). However, visual observations within this unit during 2010 indicate that greenline ecological status and woody recruitment were within natural levels given that a wildfire has recently burned through the area (C. Wood, personal observation). Since there has been little to no grazing in this unit in the last several years, livestock grazing has likely not impacted greenline ecological status and woody recruitment within this unit.

6.4.7 ANNUAL USE INDICATORS AND OBJECTIVES AND THEIR RELATIONSHIP TO FOCUS INDICATORS

Annual use indicators were selected because of their documented ability to maintain and/or achieve riparian objectives described in section 3.2.5. There is considerable overlap; the riparian system effectively integrates vegetation cover, flow regimes, sediment and nutrients (DeBano 1989). The goal is to manage livestock grazing so as not to prevent the attainment and maintenance of healthy aquatic and riparian communities (Gamett et al 2008).

Livestock will affect riparian vegetation and physical conditions differently depending on many factors, including the site's physical characteristics and conditions, the stage of plant development, the nature of the plant communities in both the riparian zone and the uplands, and current weather. There are tradeoffs in potential impacts with regard to time of grazing (Erhart and Hansen 1997). These are grazing and livestock management considerations, and while important to implementing sound riparian grazing management, are generally excluded from the following discussion.

The focus of this section is on the annual use indicators and how managing by them will help maintain or achieve the riparian resource objectives and grazing focus indicators.

Annual Use Indicators and Vegetation in Riparian Areas. How much and what type of vegetation exists in a riparian plant community, particularly on the greenline, determines how well the riparian system performs its function of reducing flow velocity, trapping sediment, building banks and protecting against erosion. The susceptibility of streambanks to damage is influenced by vegetation. Woody vegetation has an essential role in maintaining riparian function; reducing browsing pressure on riparian trees and shrubs is a significant benefit. Roots and rhizomes of herbaceous vegetation provide much of the compressive strength and soil stability for streambanks in meadow situations such as on the Challis National Forest (Clary and Kinney 2000).

Streamside vegetation strongly includes the quality of habitat for anadromous and resident coldwater fishes including shade to prevent adverse water temperatures fluctuations, roots that lend stability to overhanging banks, and the capability to filter sediment and debris (Kauffman and Krueger 1984).

Stubble height on the greenline is directly related to the health of herbaceous plants (Burton et al 2008). Dense vegetation on the floodplain during spring flooding events to trap sediment plus vigorous plant growth to stabilize sediment deposits is critical for bank building and maintenance. Residual herbaceous vegetation of six inches in a 20 year comparison study in southwestern Montana resulted in dense vigorous riparian vegetation as well as a diversity of age classes of vigorous woody riparian species (Myers 1989). In Idaho, maintaining stubble heights of 4 to 5.5 inches allowed streambank recovery (Clary 1999). Shorter stubble heights (up to six inches) are most effective in improving sediment entrapment during the deposition phase while even longer lengths retain a larger portion of deposited sediment (Clary and Leininger 2000). Four inch stubble in either late June or early July resulted in no difference in bank angle or stream width compared to no grazing in the Sawtooth Valley (Clary and Kinney 2000).

Table 3. relationship Matrix

Focus Indicator	Riparian Resource Objective	Related Element Affected by Livestock Grazing	Related Annual Use Indicator
Streambank Condition	Greenline Successional Status	Greenline Status	Greenline Stubble
	Woody Species Regeneration	Woody Species Regeneration	Browse Use
	Bank Stability	Greenline Status, Woody Species Regeneration, Current Year Alteration	Stubble Height, Browse Use, Bank Alteration
Temperature	Water Temperature	Greenline Status, Woody Species Regeneration, Vegetation Overhang	Greenline Stubble, Browse Use, Bank Alteration
Width:Depth	Width:Depth Ratio	Greenline Status, Current Year Alteration	Greenline Stubble, Browse Use, Bank Alteration
Sediment	Sediment	Greenline Status, Bank Stability, Current Year Alteration	Greenline Stubble, Browse Use, Bank Alteration
Riparian	Greenline	Greenline Status	Greenline Stubble

Conservation Areas	Successional Status		
	Woody Species Regeneration	Woody Species Regeneration	Browse Use
	Bank Stability	Greenline Status, Woody Species Regeneration, Current Year Alteration	Stubble Height, Browse Use, Bank Alteration
Spawning and Incubation	N/A	N/A	N/A

Most measurements of streamside variables moved closer to those beneficial for salmonid fisheries when pastures were grazed to four inches of graminoid stubble height; virtually all measurements improved when pastures were grazed to six inches stubble height, or when pastures were not grazed (Clary 1999). The residual stubble or regrowth should be at least four to six inches in height to provide sufficient herbaceous forage biomass to meet the requirements of plant vigor maintenance, bank and sediment entrapment (Clary and Webster 1989). This is a recommended grazing practice for "B" channel types with medium to fine easily eroded soil materials and most "C" channel types, in mid seral conditions. Special situations may require stubble heights of greater than six inches (Clary and Webster 1989, Myers 1989).

Cattle are destructive to willow stands when they congregate in them (Kovalchik and Elmore 1991, Schulz and Leininger 1990). When herbaceous forage quality diminishes, by either utilization or curing, cattle switch from grazing to browsing (Hall and Bryant 1995, Clary and Leininger 2000). The degree to which browsing of willows is compatible with maintaining willow stands depends on the relative number of willows present. Where willow browsing is light and seedling survival is high the vigor of willows is high. (Kovalchik and Elmore 1991). There is a loop between vigorous willow [and sedge] regrowth, excellent streambank protection and soil and water relationships favorable to continued willow [and sedge] production (Kovalchik and Elmore 1991).

Resistance of common riparian woody plants to defoliation has not been investigated. However, genera commonly represented in riparian areas such as dogwood, maple, cottonwood, willow and birch appear to be more resistant to foliage and twig removal than genera common to xeric uplands (Clary and Webster 1989). Many upland species can tolerate 50 – 60% use, including desirable browse species such as antelope bitterbrush, rose and aspen (Ehrhart and Hansen 1997). Less than half of heavily clipped or browsed willow stems survive into the following year (Smith 1980 and Kindschy 1989 as cited in Kovalchik and Elmore). Willow use is most critical (most likely to occur) when grazing extends into the hot summer season or fall (Myers 1989, Clary and Webster, 1989, Kovalchik and Elmore 1991). Removing cattle before 45 - 50% forage use improves the response of willows (Edwards 2009, Kovalchik and Elmore 1991). The Bureau of Land Management has concluded that exceeding 50% use of current year browse leaders would likely reduce woody vegetation vigor, modify normal growth form, and in the longer-term diminish the age class structure, all of which could affect riparian habitat conditions. Where there is current upward trend of ecological condition it is expected to continue by managing for no more than 50% browse use (USDI BLM 2009).

A study on Stanley Creek in central Idaho (Clary and Kinney 2000) applied three levels of forage use - moderate (50%), light (25%) and no grazing - on mountain meadows in the last half of June. Results were an increase in willow height and cover. Other studies cited in Clary and Kinney show that by maintaining an adequate herbaceous forage supply, and controlling the period of grazing, impacts on the willow community are reduced.

Annual Use Indicators and Streambank Alteration. Grazing along streambanks does as much or more damage to stream-riparian habitats through bank alteration as through changes in vegetation biomass. Overuse by cattle can easily destabilize and break down streambanks as vegetation is weakened and hoofs shear bank segments (Clary and Kinney 2000). A major resource management need is to consider the maintenance of streambank structure and channel form as key factors in fisheries habitat and hydrologic function.

It is widely known that bank alteration by trampling, shearing, and exposure of bare soil can be an important source of stream channel and riparian area degradation (Clary and Webster, 1989, Belsky et al., 1999). Impacts of bank alteration may include channel widening (and loss access to floodplains by peak flows), loss of riparian vegetation (which then makes banks more vulnerable to further erosion), localized lowering of water tables in riparian areas (and loss of water storage in floodplains and stream channels), and changes in sediment transport capacity of stream channels (Clary and Webster 1989).

Literature such as Clary and Webster (1989) often refers to the indirect effect on streambank trampling. A number of other authors who reviewed the literature summarized that careful control of grazing duration and season results in maintenance of the streambank vegetation and limitation of trampling, hoof slide, and accelerated streambank cave-in (Erhart and Hansen 1997, Clary and Leininger 2000).

Some researchers have concluded that bank alteration, taking natural channel stability into account, is the most important factor to consider in evaluating physical stream channel conditions and impacts from land use. Streambank alterations of 20% or less are expected to allow for upward trend of streams with stream widths narrowing and depths increasing (Bengeyfield, 2006).

In southwestern Montana, stream channels narrowed and deepened when streambank disturbance from cattle did not exceed 30 feet per 100 feet of stream reach (Dallas 1997 cited in Mosley et al., 1997). Based on Cowley's literature review, "it appears that 70 percent unaltered streambanks (i.e., 30 percent altered streambanks) is the minimum level that would maintain stable conditions. All of [the] authors consider both natural and accelerated alteration in the totals". Cowley suggested that 80% unaltered streambanks should allow for "making significant progress" toward stream channel improvement, and that this value should be the maximum allowable streambank alteration (Cowley 2002 cited in Simon 2008).

7 ANALYSIS OF EFFECTS

This section contains the effects analysis. The effects of the proposed action are described below and summarized in Table 4. The analysis emphasizes the expected effects of the proposed action on the six focus indicators.

7.1 DIRECT AND INDIRECT EFFECTS

Direct effects are those effects that are a direct result of the action. Indirect effects are "caused by the proposed action and are later in time, but still are reasonably certain to occur" (50 CFR§402.02).

Direct effects of livestock grazing may occur when livestock enter streams occupied by listed salmonids to loaf, drink, or cross the stream. Livestock entering fish-spawning areas can trample redds, and destroy or dislodge embryos and alevins (Belsky et al. 1997, Gamett et al. 2009).

Improperly managed grazing can additionally have adverse indirect effects to streams and riparian areas (Menke 1977; Clary and Webster 1989; Belsky et al. 1997). These effects can include modifications to stream temperatures, sediment levels, width:depth ratios, bank stability, and riparian vegetation.

A variety of conservation measures can be implemented to minimize or eliminate potential grazing related effects to listed fish and their aquatic and riparian habitats. These include:

- <u>Strategic Rotation:</u> Unit rotation strategies designed to move livestock off streams during critical spawning periods can avoid direct impact to spawning fish or their incubating redds.

- <u>Fencing:</u> Fencing sensitive riparian areas can be an effective way of protecting riparian resources, fish habitat and fish populations. Platts (1991) found that, in 20 of 21 studies, stream and riparian habitats improved when grazing was prohibited in fenced riparian zones.

- <u>Utilization Standards:</u> Establishing utilization standards for forage utilization and moving livestock when these standards are approached or reached, can help avoid many of the adverse effects that livestock grazing can have on fish and their habitat.

The likely impacts of the proposed action on the six grazing focus indicators are discussed below.

7.1.1 SPAWNING AND INCUBATION

Livestock wading through streams can step on salmonid redds (Gregory and Gamett 2009, Ballard and Krueger 2005a, Ballard and Krueger 2005b). This process has been referred to as redd trampling (Gregory and Gamett 2009) and may result in the death of eggs and alevins which are developing in the gravel. Gregory and Gamett (2009) estimated that livestock grazing under routine conditions on national forest lands could trample up to 78% of bull trout redds. This level of trampling could result in a significant reduction in egg and alevin survival and could significantly reduce the size of the bull trout population.

The East Fork Unit is the only unit containing bull trout spawning habitat on the allotment. Although there is no specific data on bull trout spawning periods for this unit, it is believed that bull trout begin spawning within this unit sometime after August 15. Since livestock will not be in this unit after August 15, there is no potential for bull trout to trample bull trout redds in the unit. This is significant in that this unit contains 2.30 miles of bull trout spawning habitat and all of the bull trout spawning habitat within the action area.

The lack of spawning habitat in the Tater Creek and Spring Gulch units precludes livestock grazing from affecting bull trout spawning in those units.

7.1.2 WATER TEMPERATURE

Stream temperatures can have a significant impact on bull trout distribution and abundance. Gamett (2002) evaluated the relationship between bull trout distribution and abundance in the Little Lost River basin and found that bull trout were always present in stream reaches where the July-September mean temperature (JSMT) was less than 10.0℃ but were never present where the JSMT was greater than 12.0℃. This work also found that bull trout densities (fish >70mm/100 m^2) were highest where the JSMT was 7.0-7.9℃ but dropped sharply as the JSMT increased. Specifically, mean bull trout density was 15.0 fish/100 m^2 where the JSMT was 7.0-7.9℃, 10.1 fish/100 m^2 where the JSMT was 8.0-8.9℃, 1.6 fish/100 m^2 where the JSMT was 9.0-9.9℃, 0.4 fish/100 m^2 where the JSMT was 10.0-10.9℃, 0.1 fish/100 m^2 where the JSMT was 11.0-12.0℃, and 0.0 fish/100 m^2 where the JSMT was greater than 12.0℃. This work suggests that even small increases in stream temperature could result in dramatic decreases in bull trout abundance.

Livestock grazing can modify stream temperatures (Armour et al. 1994). Stream temperatures are controlled by a complex interaction between stream shading, width:depth ratio, ground water input, water volume, air temperature, and source water temperature. Livestock can have significant impacts on stream shading, width:depth ratios, groundwater input, and water volume and through these mechanisms they can impact stream temperatures. Subsequently, summer stream temperatures are often higher in grazed areas compared to ungrazed areas (Platts 1991). Isaak and Hubert (2001) found that cattle density was inversely related to maximum summer stream temperatures. Stream temperature modeling completed by Gamett (2002) indicated that changes in water temperature brought about by modifications to streamside shading could have significant impacts on bull trout populations. This work evaluated how water temperature and bull trout abundance might change in a hypothetical stream typical of some streams in the Little Lost River basin when stream shade was reduced from 90% to 10%. This work found that such a change could increase the maximum water temperature observed on August 1 from 10.4℃ to 21.6℃ and that such a reduction would reduce the probability of bull trout being present from 100% to 6% and would reduce the number of salmonids that were bull trout from 88% to 7%.

Although biologists typically consider the effects of livestock grazing on summer stream temperatures, the impact of livestock grazing on winter temperatures should not be overlooked. While livestock grazing can result in higher summer stream temperatures it can also cause lower stream temperatures in the winter (Armour et al. 1994). This can occur when livestock grazing results in a loss of cover or when livestock grazing increases the width:depth ratio thereby increasing the surface:volume ratio. Either of these affects can reduce the ability of a stream to buffer itself against cold winter air temperatures and can lead to increased icing and a subsequent loss of habitat.

Livestock grazing may have some minor impacts on water temperatures in the East Fork Unit. In the East Fork Unit, livestock access to the streams is limited in most areas due to vegetation and topography. In these areas, livestock use along the streams is expected to be incidental and livestock grazing is expected to have little, if any, impact on features that affect stream temperatures. However, there are a few small meadows in this unit where livestock have access to the streams. In these areas, livestock have the potential to have impact features that affect stream temperatures such as riparian vegetation and width:depth ratios. However, this impact should be limited due to the small size of the meadows; monitoring that will occur in the largest meadow; and the end of season indicators which include a stubble height of not less than six inches, a bank alteration of not more than 10%, woody browse on single-stemmed species of not more than 30%, and woody browse on multi-stemmed species of not more than 50%. For these reasons, the effect of livestock grazing on water temperature within this unit is expected to be limited and will likely not limit the ability of streams in this unit to support bull trout.

Since livestock grazing in the Tater Creek Unit will be limited to incidental use, livestock grazing is expected to have little, if any, impact on features that affect stream temperatures such as riparian vegetation and width:depth ratios in this unit.

The lack of fish habitat within the Spring Gulch Unit precludes livestock grazing from affecting water temperatures in a manner that affects fish in that unit.

7.1.3 SEDIMENT

Increased sediment in streams can reduce the survival of salmonid eggs and alevins that are incubating in the stream substrate. For example, Reiser and White (1988) evaluated the impact of fine (<0.84 mm) and coarse (0.84-4.6 mm) sediment on the survival of Chinook salmon and steelhead eggs in the laboratory. They found that the survival of steelhead eggs was about 85% when fine sediment was 0% but when fine sediment was 10% survival dropped to about 25%. Almost no eggs survived when fine sediments were 30%. With Chinook salmon eggs, they found that the survival was about 65% when fine sediment was 0% but that survival was only about 10% when fine sediment was 10%. Like the steelhead, almost no eggs survived when fine sediments were 30%. Experiments with course sediments also showed a sharp decline in the survival of both Chinook salmon and steelhead eggs as sediment levels increased from 0 to 30%. Similarly, Phillips et al. (1975) found that the survival of steelhead and coho salmon eggs dropped sharply as the amount of fines (1-3 mm) in the substrate increased. Although data relating to relationship between sediment and the survival of bull trout eggs are not available, increased sediment levels undoubtedly reduces the survival of bull trout eggs.

Sediment can also have impacts on trout abundance. For example, Watson and Hillman (1997) found that bull trout densities were negatively correlated with the amount of surface fines (< 2 mm). Similarly, Zoellick and Cade (2006) found that redband trout densities in southwestern Idaho were often greater than 40.0 fish/100 m^2 where surface fines (< 2 mm) were less than 20% but that densities were never greater than 40.0 fish/100 m^2 when surface fines were greater than 40%.

Livestock grazing can significantly increase stream sediment levels. This is done through impacts to upland vegetation thereby increasing sediment generated from the uplands and by impacts that reduce bank stability thereby increasing sediment generated by bank erosion. Subsequently, streams in grazed areas typically have more fine sediment than streams in ungrazed areas (Platts 1991). Lusby (1970) evaluated sediment production in grazed and ungrazed watersheds in Colorado and found that sediment production was about 45% less in ungrazed watersheds compared to grazed watersheds. Dahlem (1979) studied changes in stream sediment levels following the elimination of cattle grazing in the Mahogany Creek watershed in Nevada. He found that just two years after livestock were removed from the watershed, the amount of stream bottom covered by silt had declined from 27% to 11% and that spawning gravels increased from 52% to 70%. Hubert et al. (1985) compared sections of a Wyoming stream that were grazed with those that had not been grazed for four years. They found that the substrate in sections of the stream that were grazed was 22% silt whereas the substrate in sections of stream that had not been grazed for four years was just 13% silt. Since livestock grazing can lead to increased sediment levels in streams and subsequently impact fish populations it is important to consider the effect of livestock grazing on stream sediment levels.

Livestock grazing may have some minor impacts on sediment levels in the East Fork Unit. In the East Fork Unit, livestock access to the streams is limited in most areas due to vegetation and topography. In these areas, livestock use along the streams is expected to be incidental and livestock grazing is expected to have little, if any, impact on stream sediment. However, there are a few small meadows in this unit where livestock have access to the streams. In these areas, livestock have the potential to impact sediment. However, this impact should be limited due to the small size of the meadows; monitoring that will occur in the largest meadow; and the end of season indicators which include a stubble height of not less than six inches, a bank alteration of not more than 10%, woody browse on single-stemmed species of not more than 30%, and woody browse on multi-stemmed species of not more than 50%. For these reasons, the effect of livestock grazing on stream sediment levels within this unit is expected to be limited and will likely not limit the ability of streams in this unit to support bull trout.

Since livestock grazing in the Tater Creek Unit will be limited to incidental use, livestock grazing is expected to have little, if any, impact on stream sediment in this unit.

The lack of fish habitat within the Spring Gulch Unit precludes livestock grazing from affecting sediment in a manner that affects fish in that unit.

7.1.4 WIDTH: DEPTH RATIO

Fish abundance is often negatively correlated with width:depth ratio (Lanka et al. 1987, Scarnecchia and Bergersen 1987). Kozel et al. (1989) studied several streams in Wyoming and found a negative correlation between width:depth ratio and trout biomass. Similarly, Dunham et al. (2002) studied several streams in Nevada and found that Lahontan cutthroat trout densities were often greater than 30 fish/100 m^2 when width:depths ratios were less than 20 but were generally less than 30 fish/100 m^2 when width width:depth ratios were greater than 30.

Livestock grazing can increases width:depth ratios (Platts 1991, Riedel et al. 2006). Hubert et al. (1985) compared sections of a Wyoming stream that were “heavily grazed” and “lightly grazed” and found that the width:depth ratio in the “heavily grazed” section was 43 while in the “lightly grazed” section it was just 21. On another stream they compared sections of stream that were grazed with those that had not been grazed for four years. They found that the width:depth ratio in the grazed sections was 37 whereas the width:depth ratio in the ungrazed sections was just 28.

Clary (1999) studied the effect of livestock grazing on width:depth ratios in Stanley Creek in Idaho. He evaluated the changes in width:depth ratios that occurred when grazing was changed from season long, heavy use (60-65% utilization in dry meadows) to either grazing in late June with medium use (35-50% utilization in dry meadows), grazing in late June with light use (20-25% utilization in dry meadows), and no grazing at all. He found that there was a significant decrease in width:depth ratios with all three grazing strategies but that the decrease was greatest in the areas where livestock were not grazed at all.

Overton et al. (1994) compared width:depth ratios in sections of grazed and ungrazed streams in California. In Coyote Valley Creek, they found that two rested sections of stream had width:depth ratios of 3.5 and 3.0 whereas the three grazed sections had width:depth ratios of 6.8, 7.4, and 7.6. In Silver King Creek, they found that two rested sections had width:depth ratios of 21.4 and 15.4 whereas two grazed sections had width:depth ratios of 27.7 and 16.4. Two ungrazed streams similar to Silver King Creek had width:depth ratios of 15.3 and 14.6.

Livestock grazing may have some minor impacts on width:depth ratios in the East Fork Unit. In the East Fork Unit, livestock access to the streams is limited in most areas due to vegetation and topography. In these areas, livestock use along the streams is expected to be incidental and livestock grazing is expected to have little, if any, impact on width:depth ratios. However, there are a few small meadows in this unit where livestock have access to the streams. In these areas, livestock have the potential to impact width:depth ratios. However, this impact should be limited due to the small size of the meadows; monitoring that will occur in the largest meadow; and the end of season indicators which include a stubble height of not less than six inches, a bank alteration of not more than 10%, woody browse on single-stemmed species of not more than 30%, and woody browse on multi-stemmed species of not more than 50%. For these reasons, the effect of livestock grazing on stream width:depth ratios within this unit is expected to be limited and will likely not limit the ability of streams in this unit to support bull trout.

Since livestock grazing in the Tater Creek Unit will be limited to incidental use, livestock grazing is expected to have little, if any, impact on width:depth ratio in this unit.

The lack of fish habitat within the Spring Gulch Unit precludes livestock grazing from affecting width:depth ratios in a manner that affects fish in that unit.

7.1.5 STREAMBANK CONDITION

Bank stability can have important affects on fish populations. Zoellick and Cade (2006) found that redband trout densities in southwestern Idaho were often greater than 40.0 fish/100 m^2 in stream reaches where bank stability exceeded 80% but were rarely greater than 40.0 fish/100 m^2 when bank stability was less than 80%.

Livestock grazing can significantly reduce bank stability. This occurs when livestock modify the abundance or composition of riparian vegetation in a manner that makes the bank more vulnerable to erosion or when livestock directly impact the bank through bank trampling. Subsequently, streams in grazed areas often have lower bank stabilities than streams in ungrazed areas (Platts 1991). Riedel et al. (2006) evaluated the impact of livestock grazing on bank stability in the Nemadji River watershed in Minnesota and found that grazing "significantly reduced stream bank stability." Overton et al. (1994) compared bank stabilities in sections of grazed and ungrazed streams in California. In Coyote Valley Creek, they found that two rested sections of stream had bank stabilities of 92.8 and 98.9% whereas three grazed sections had bank stabilities of 62.2, 45.6, and 42.5%. In Silver King Creek, they found that the two rested sections had bank stabilities of 82.4 and 63.7% whereas the two grazed sections had bank stabilities of 60.0 and 60.2%. Two ungrazed streams similar to Silver King Creek had bank stabilities of 91.5 and 100%. Hubert et al. (1985) compared sections of a Wyoming stream that were grazed with those that had not been grazed for four years. They found that banks in grazed sections had 23% bare soil whereas banks in sections that had not been grazed for four years had just 12% bare soil. Since livestock grazing can reduce bank stability and subsequently impact fish populations it is important to consider the effect of livestock grazing on bank stability.

Livestock grazing may have some minor impacts on bank stability in the East Fork Unit. In the East Fork Unit, livestock access to the streams is limited in most areas due to vegetation and topography. In these areas, livestock use along the streams is expected to be incidental and livestock grazing is expected to have little, if any, impact on bank stability. However, there are a few small meadows in this unit where livestock have access to the streams. In these areas, livestock have the potential to impact bank stability. However, this impact should be limited due to the small size of the meadows; monitoring that will occur in the largest meadow; and the end of season indicators which include a stubble height of not less than six inches, a bank alteration of not more than 10%, woody browse on single-stemmed species of not more than 30%, and woody browse on multi-stemmed species of not more than 50%. For these reasons, the effect of livestock grazing on stream bank stability within this unit is expected to be limited and will likely not limit the ability of streams in this unit to support bull trout.

Since livestock grazing in the Tater Creek Unit will be limited to incidental use, livestock grazing is expected to have little, if any, impact on bank stability in this unit.

The lack of fish habitat within the Spring Gulch Unit precludes livestock grazing from affecting bank stability in a manner that affects fish in that unit.

7.1.6 RIPARIAN CONSERVATION AREAS

Modifications to riparian habitat can have significant impacts on fish populations. Changes in riparian vegetation caused by livestock grazing can 1) increase the ability of livestock to access the stream thereby increasing redd trampling, 2) increase stream temperatures in the summer and lower streams temperatures in the winter, 3) increase stream sediment levels, 4) increase width:depth ratios, and 5) reduce bank stability. All of these modifications can have negative impacts on fish populations.

In addition, modifications to riparian vegetation can modify cover for fish. Boussu (1954) studied the effects of cover on trout abundance in a stream in Montana and found that when willow cover was added to sections of stream that post treatment fish numbers more than doubled and fish biomass more than tripled compared to pre-treatment levels. In sections of stream where cover was removed, post treatment fish numbers remained relatively unchanged but post treatment fish biomass declined by nearly half.

Likewise, Kozel et al. (1989) found a positive correlation between the amount of overhanging vegetation along the stream and trout biomass in several streams in Wyoming.

Livestock grazing can have important impacts on riparian vegetation (Armour et al.1994). Schulz and Leininger (1990) studied the effects of cattle grazing on riparian vegetation in the Sheep Creek watershed in Colorado and found considerable differences in the riparian vegetation between grazed and ungrazed areas. For example, they found considerable differences in the composition of some plants species between grazed and ungrazed areas and also found that vascular vegetation provided 26% more ground cover in ungrazed areas. They also observed about five times as much bare ground in ungrazed areas and that the mean standing crop of vegetation was 2,410 kg/ha in ungrazed areas and but was only 1,217 kg/ha inside caged plots within the grazed areas. Clary (1999) studied the effect of livestock grazing on riparian vegetation on Stanley Creek in Idaho. He evaluated the response of riparian vegetation when grazing was changed from season long, heavy use (60-65% utilization in dry meadows) to either grazing in late June with medium use (35-50% utilization in dry meadows), grazing in late June with light use (20-25% utilization in dry meadows), and no grazing at all. He found that there was a significant increase in late seral species in both lightly grazed and ungrazed areas whereas late seral species decreased in the areas with medium use.

Livestock grazing can also have a pronounced impact on woody species. For example, Schulz and Leininger (1990) found 5.5 times more shrub cover and 8.5 times more willow cover in ungrazed areas compared to grazed areas. They also found that willows were older and larger in ungrazed areas compared to grazed areas. Clary (1999), found that willow cover increased by 29% in areas with medium use, 37% in areas with light use, and 56% in areas that were not grazed at all. Hubert et al. (1985) compared sections of a Wyoming stream that were grazed with those that had not been grazed for four years and found that while woody vegetation was abundant in both grazed and ungrazed areas that cottonwoods were not present in the grazed area but were present along the ungrazed sections of stream. Gunderson (1968) studied the effects of livestock grazing on riparian and stream habitat in Rock Creek, Montana and found that stream cover provided by overhanging brush was twice as high in ungrazed areas compared to grazed areas.

Livestock grazing may have some minor impacts on greenline ecological status and woody recruitment in the East Fork Unit. Most of the riparian areas within this unit are dominated by dense vegetation consisting of coniferous trees, deciduous trees, and deciduous shrubs. The impact of livestock grazing in these areas is expected to be limited due to the density of the vegetation and lack of species preferred by livestock. Therefore, livestock grazing is expected to have little, if any, impact on greenline ecological status and woody recruitment in these areas. However, there are a few small meadows in this unit where livestock have access to the streams. In these areas, livestock have the potential to impact greenline ecological status and woody recruitment. However, this impact should be limited due to the small size of the meadows; monitoring that will occur in the largest meadow; and the end of season indicators which include a stubble height of not less than six inches, a bank alteration of not more than 10%, woody browse on single-stemmed species of not more than 30%, and woody browse on multi-stemmed species of not more than 50%. For these reasons, the effect of livestock grazing on stream greenline ecological status and woody recruitment within this unit is expected to be limited and will likely not limit the ability of streams in this unit to support bull trout.

Since livestock grazing in the Tater Creek Unit will be limited to incidental use, livestock grazing is expected to have little, if any, impact on greenline ecological status and woody recruitment in this unit.

The lack of fish habitat within the Spring Gulch Unit precludes livestock grazing from affecting greenline ecological status and woody recruitment in a manner that affects fish in that unit.

7.2 CUMULATIVE EFFECTS

Cumulative effects as used for Section 7 consultation under the Endangered Species Act are "those effects of *future State or private activities*, not involving Federal activities, that are *reasonably certain to occur* within the action area" (50 CFR§402.02, emphasis added). This definition should not be confused with the broader definition that is used under the National Environmental Policy Act and other environmental laws. In this context, cumulative effects apply only to future state and private activities that are reasonably certain to occur. Furthermore, if an activity is currently occurring and will likely continue to occur in the future with similar effects, it is not considered under cumulative effects because it has already been considered in the description of baseline conditions. There are no known future state or private activities that will occur in the action area that are not already occurring.

7.3 SUMMARY OF EFFECTS

The proceeding analysis has described the likely effects of the proposed action on the six focus indicators. The effects of the proposed action on the pathways and indicators is provided in Table 4. A summary of the affects of the proposed action on listed species and designated critical habitat is provided below.

7.3.1 SNAKE RIVER SOCKEYE SALMON

Sockeye salmon and sockeye salmon designated critical habitat do not occur within the action area. Therefore, the proposed action will not affect sockeye salmon or sockeye salmon designated critical habitat.

7.3.2 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

Chinook salmon and Chinook salmon designated critical habitat do not occur within the action area. Therefore, the proposed action will not affect Chinook salmon and Chinook salmon designated critical habitat.

7.3.3 SNAKE RIVER STEELHEAD

Steelhead and steelhead designated critical habitat do not occur within the action area. Therefore, the proposed action will not affect steelhead and steelhead designated critical habitat.

7.3.4 COLUMBIA RIVER BULL TROUT

Bull trout and bull trout critical habitat do occur in the action area. The effects analysis concluded that the proposed action will not directly affect bull trout but may impact water temperature, sediment, width:depth ratio, bank stability, and riparian conservation areas. However, these affects are expected to be minor and likely will not reach the level where they could be meaningfully measured or detected.

8 EFFECTS DETERMINATION

8.1 SNAKE RIVER SOCKEYE SALMON

The lack of sockeye salmon and sockeye salmon designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on sockeye salmon and sockeye salmon designated critical habitat. Therefore, the proposed action results in a “NO EFFECT” determination for sockeye salmon and a “NO EFFECT” determination for sockeye salmon designated critical habitat (Table 5).

8.2 SNAKE RIVER SPRING/SUMMER CHINOOK SALMON

The lack of Chinook salmon and Chinook salmon designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on Chinook salmon and Chinook salmon designated critical habitat. Therefore, the proposed action results in a “NO EFFECT” determination for Chinook salmon and a “NO EFFECT” determination for Chinook salmon designated critical habitat (Table 5).

8.3 SNAKE RIVER STEELHEAD

The lack of steelhead and steelhead designated critical habitat within the action area precludes the proposed action from having direct, indirect, or cumulative effects on steelhead and steelhead designated critical habitat. Therefore, the proposed action results in a "NO EFFECT" determination for steelhead and a "NO EFFECT" determination for steelhead designated critical habitat (Table 5).

8.4 COLUMBIA RIVER BULL TROUT

The effects analysis concluded that the proposed action will not affect bull trout redds and will not lead to the death of bull trout eggs. The proposed action may have some minor effects on bull trout habitat. However, these impacts are expected to be insignificant and will likely not reduce the ability of the habitat to support bull trout. Therefore, the proposed action results in a "MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT" determination for bull trout (Table 5).

The effects analysis concluded that the proposed action may have some minor effects on bull trout designated critical habitat. However, these impacts are expected to be insignificant and will likely not reduce the ability of the habitat to support bull trout. Therefore, the proposed action results in a "MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT" determination for bull trout designated critical habitat (Table 5).

8.5 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to evaluate the impact of actions authorized, funded, or undertaken by the agency that may adversely affect the essential fish habitat of commercially harvested species. Within the scope of this action this includes Chinook salmon.

The lack of Chinook salmon and Chinook salmon designated critical habitat within the action area precludes the proposed action from affecting Essential Fish Habitat for Chinook salmon. Therefore, the proposed action results in a "WILL NOT ADVERSELY AFFECT" determination for Chinook salmon Essential Fish Habitat.

Figure 5 – Large talus slides extending into the bottom of the Tater Creek drainage (Photograph taken on August 18, 2010).

Figure 6 – Large talus slide extending into the bottom of the Tater Creek drainage(Photograph taken on August 18, 2010). Note the lack of a stream channel across the slide.

FIGURE 7 – TATER CREEK ABOVE THE TALUS SLIDES (PHOTOGRAPH TAKEN ON AUGUST 18, 2010).

FIGURE 8 – TATER CREEK ABOVE THE TALUS SLIDES (PHOTOGRAPH TAKEN ON AUGUST 18, 2010).

FIGURE 9 – EAST FORK LITTLE MORGAN CREEK IN THE EAST FORK UNIT APPROXIMATELY 0.1 MILES ABOVE THE FOREST BOUNDARY (PHOTOGRAPH TAKEN ON AUGUST 18, 2010). THE RIPARIAN AREA HERE, WHICH IS DOMINATED BY DENSE VEGETATION CONSISTING OF CONIFEROUS TREES, DECIDUOUS TREES, AND DECIDUOUS SHRUBS, IS REPRESENTATIVE OF RIPARIAN AREAS ACROSS MUCH OF THE UNIT.

FIGURE 10 – STREAM IN THE EAST FORK UNIT APPROXIMATELY 0.4 MILES ABOVE THE FOREST BOUNDARY (PHOTOGRAPH TAKEN ON AUGUST 18, 2010). THE RIPARIAN AREA HERE IS NOT TYPICAL OF RIPARIAN AREAS ACROSS THE UNIT BUT DOES REPRESENT THE SMALL "CRITICAL AREAS" WHERE LIVESTOCK HAVE ACCESS TO THE STREAM AND CAN HAVE SIGNIFICANT IMPACTS TO THE STREAM AND RIPARIAN HABITAT.

FIGURE 11 – THE DMA IN THE EAST FORK UNIT (PHOTOGRAPH TAKEN ON JULY 7, 2009).

TABLE 4. SUMMARY OF EFFECTS (INDICATORS ASSOCIATED WITH THE SIX "FOCUS INDICATORS" HAVE BEEN SHADED).

Pathway	Indicators	Functionality Of Baseline	**Response Column A** Will the proposed action or any interrelated or interdependent actions likely generate any direct or indirect effects to this indicator?			**Response Column B** Are these effects expected to exceed beneficial, insignificant, or discountable?		
			CH	SH	BT	CH	SH	BT
Subpopulation Characteristics	Subpopulation Size	Functioning at Risk	na	na	NO	na	na	NO
	Growth and Survival (including incubation survival)	Unknown	na	na	NO	na	na	NO
	Life History Diversity and Isolation	Functioning at Unacceptable Risk	na	na	NO	na	na	NO
	Persistence and Genetic Integrity	Functioning at Unacceptable Risk	na	na	NO	na	na	NO
Water Quality	Temperature	Functioning Appropriately	NO	NO	YES	na	na	NO
	Sediment	Unknown	NO	NO	YES	na	na	NO
	Chemical Characteristics	Unknown	NO	NO	NO	na	na	NO
Habitat Access	Physical Barriers	Unknown	NO	NO	NO	na	na	NO
Habitat Elements	Substrate Embed.	Unknown	NO	NO	NO	na	na	NO
	LWD	Unknown	NO	NO	NO	na	na	NO
	Pool Frequency and Quality	Unknown	NO	NO	YES	na	na	NO
	Off-channel Habitat	Unknown	NO	NO	YES	na	na	NO
	Refugia	Functioning at Risk	NO	NO	NO	na	na	NO
Channel Condition and Dynamics	Width:Depth Ratio	Unknown	NO	NO	YES	na	na	NO
	Streambank Condition	Unknown	NO	NO	YES	na	na	NO
	Floodplain Connectivity	Unknown	NO	NO	YES	na	na	NO

Flow/Hydrology	Change in Peak/Base Flows	Unknown	NO	NO	NO	na	na	NO
	Increase in Drainage Networks	Functioning Appropriately	NO	NO	NO	na	na	NO
Watershed Conditions	Road Density and Location	Functioning at Risk	NO	NO	NO	na	na	NO
	Disturbance History	Functioning Appropriately	NO	NO	NO	na	na	NO
	Riparian Conservation Areas	Functioning at Risk	NO	NO	YES	na	na	NO
	Disturbance Regime	Functioning Appropriately	NO	NO	NO	na	na	NO
Integration of Species and Habitat Conditions	Habitat Quality and Connectivity	Functioning at Risk	NO	NO	YES	na	na	NO

TABLE 5. EFFECTS DETERMINATION SUMMARY.

Species	**Category**	**Determination**[1]
Sockeye Salmon	Species	No Effect
	Designated Critical Habitat	No Effect
Chinook Salmon	Species	No Effect
	Designated Critical Habitat	No Effect
	Essential Fish Habitat	Will Not Adversely Affect
Steelhead	Species	No Effect
	Designated Critical Habitat	No Effect
Bull Trout	Species	Not Likely to Adversely Affect
	Designated Critical Habitat	Not Likely to Adversely Affect

[1] The ‘Species’ column is for determining effects to the species. The ‘Habitat’ column is for determining effects to designated or proposed critical habitat. The species determinations are made as follows: No Effect (NE) if the species is not present in the action area or the proposed action or any interrelated or interdependent actions will not affect any individuals, May Affect- Not Likely to Adversely Affect (MA-NLAA) if the proposed action or any interrelated or interdependent actions may affect but will likely not adversely affect any individuals, and May Affect- Likely to Adversely Affect (MA-LAA) if the proposed action or any interrelated or interdependent actions will result in take of individuals. The habitat determinations are made as follows: NE if the action area does not contain designated critical habitat or all of the responses associated with habitat in ‘Response Column A’ are ‘NO’, NLAA if all of the responses associated with habitat in ‘Response Column B’ are ‘NO’, LAA if any of the responses associated with habitat in ‘Response Column B’ are ‘YES’.

APPENDIX A – REFERENCES

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APPENDIX B – WATERSHED BASELINES WITH MATRICES OF DIAGNOSTIC PATHWAYS AND INDICATORS

Table B1. Status of baseline conditions for the Morgan Creek 6th Field HUC.

Agency: USDA Forest Service, Salmon-Challis National Forest	**6th Field HUC and Name:** 070602020313, Morgan Creek (Pahsimeroi Basin)5
Unit: Challis-Yankee Fork Ranger District	**Spatial Scale of Matrix:** One 6th HUC (Morgan Creek)
Fish Species Present: Bull Trout	**Designated Critical Habitat Present:** Bull Trout
Anadromous Species Major Population Group: Upper Salmon River Chinook Salmon MPG, Salmon River Steelhead MPG	**Anadromous Species Subpopulation:** Pahsimeroi River Chinook Salmon Population, Pahsimeroi River Steelhead Population
Bull Trout Core Area: Pahsimeroi River	**Local Population:** Little Morgan Creek
Management Actions: Baseline	**Last Updated:** 05-19-2012

Pathway	Indicators	Functionality Of Baseline	Description
Subpopulation Characteristics	Subpopulation Size	Functioning at Risk	Bull trout are found throughout the subwatershed and densities are relatively high (Bartel et al 2009, Liter and Lukens 1992). However, the small size of the subwatershed limits the population size.
	Growth and Survival	Unknown	Little is known about the growth and survival of bull trout within the subwatershed.
	Life History Diversity and Isolation	Functioning at Unacceptable Risk	The resident form of bull trout is present in the subwatershed. However, Little Morgan Creek is currently not connected to the Pahsimeroi River due to diversions (B. Gamett, personal observation). This has isolated bull trout in the subwatershed and prevents migratory bull trout from accessing the subwatershed.
	Persistence and Genetic Integrity	Functioning at Unacceptable Risk	Connectivity within the subwatershed appears to be good. However, the lack of a connection between this subwatershed and other streams in the Pahsimeroi River basin prevents genetic exchange between bull trout in the subwatershed and other bull trout populations in the Pahsimeroi River basin. This lack of genetic exchange coupled with the relative small size of the bull trout population could place the bull trout population in the subwatershed at risk in the long term. Brook trout and other non-native species are not present in the subwatershed (Bartel et al 2009, Liter and Lukens 1992). Therefore, the probability of hybridization or displacement by non-native species is low.

5 The baseline matrix is generally generated at a 5th filed HUC level. However, the Salmon River-Slate Creek subwatershed (5th Field HUC: 1706020108) is not a true watershed and has the mainstem Salmon River flowing through the middle of the watershed. Therefore, something occurring in one part of the watershed may have very little impact in another part of the watershed. For this reason, this baseline matrix is being generated at the 6th field HUC level.

Water Quality	Temperature	Functioning Appropriately	Stream temperature data were collected from two locations in the subwatershed by the Forest Service in 2009 (Gamett et al. 2009). At the site on East Fork at the Forest boundary the maximum temperature was 8.9℃, the 7-day moving average of daily maximum temperatures (7DMMAX) was 8.7℃, and the July 1 to September 30 mean temperature was 7.3℃. At the site on North Fork above the Forest boundary the maximum temperature was 10.8℃, the 7DMMAX was 10.1℃, and the July 1 to September 30 mean temperature was 7.6℃. The condition of this indicator off national forest lands is not known.
	Sediment	Unknown	Little is known about sediment levels within the subwatershed. Visual observations in the East Fork suggest the condition of this indicator in that stream is similar to natural conditions in most areas (B. Gamett, personal observation). The condition of this indicator in other portions of the subwatershed is not known.
	Chemical Characteristics	Unknown	Little is known about chemical characteristics within the subwatershed. The condition of this indicator on national forest lands is likely similar to natural conditions in most areas (B. Gamett, professional judgment). The condition of this indicator off national forest lands is not known.
Habitat Access	Physical Barriers	Unknown	There are no known artificial barriers on national forest lands within this sub-watershed (B. Gamett, personal observation). The condition of this indicator off national forest lands is not known.
Habitat Elements	Substrate Embeddedness	Unknown	Little is known about substrate embeddedness within the subwatershed.
	LWD	Unknown	Little is known about large woody debris within the subwatershed. Visual observations suggest the condition of this indicator on national forest lands is similar to natural conditions in most areas (B. Gamett, personal observation). The condition of this indicator off national forest lands is not known.
	Pool Frequency and Quality	Unknown	Little is known about pool frequency and quality within the subwatershed.
	Off-channel Habitat	Unknown	Little is known about off-channel habitat within the subwatershed.
	Refugia	Functioning at Risk	There is an abundance of suitable bull trout habitat relative to the size of the subwatershed. However, the subwatershed is isolated from other streams in the Pahsimeroi River basin.
Channel Condition and Dynamics	Width:Depth Ratio	Unknown	Little is known about width:depth ratio within the subwatershed. Width:depth ratio data were collected from East Fork in 2009 and the width:depth ratio was 11.7 (Salmon-Challis National Forest, unpublished data). The condition of this indicator off national forest lands is not known.

	Streambank Condition	Unknown	Little is known about streambank condition within the subwatershed. Bank stability data were collected from East Fork in 2009 and bank stability was 6% (Salmon-Challis National Forest, unpublished data). Stream and riparian habitat conditions were further reviewed on East Fork Morgan Creek in 2010 (B. Gamett, personal observation). It was found that most of the riparian areas in this area were dominated by dense vegetation consisting of coniferous trees, deciduous trees, and deciduous shrubs and that bank stabilities in these areas were likely similar to natural conditions. The condition of this indicator in other portions of the subwatershed is not known.
	Floodplain Connectivity	Unknown	Little is known about floodplain connectivity within the subwatershed.
Flow/Hydrology	Change in Peak/Base Flows	Unknown	The condition of this indicator on national forest lands is likely similar to natural conditions (B. Gamett, professional judgment). The condition of this indicator off national forest lands is not known but it has likely been impacted by diversions on private and BLM lands.
	Increase in Drainage Networks	Functioning Appropriately	There have been no known increases in active channel length correlated with human caused disturbances within this sub-watershed (B. Gamett, professional judgement).
Watershed Conditions	Road Density and Location	Functioning at Risk	The overall road density within the subwatershed is less than 1 mile of road/mi^2 but there are some valley bottom roads (B. Gamett, personal observation). There are no roads on national forest lands within this subwatershed (B. Gamett, personal observation).
	Disturbance History	Functioning Appropriately	No significant timber harvest has occurred in the subwatershed in the last 50 years (B. Gamett, personal observation).
	Riparian Conservation Areas	Functioning at Risk	Riparian data were collected from East Fork Morgan Creek in 2009 (Salmon-Challis National Forest, unpublished data). Greenline ecological status was 24, total woody species density was 2,909 plants/acre, seedlings and young density was 885 plants/acre, and seedlings and young comprised 29% of the total woody population. Stream and riparian habitat conditions were further reviewed on East Fork Morgan Creek in 2010 (B. Gamett, personal observation). It was found that most of the riparian communities in this area were dominated by dense vegetation consisting of coniferous trees, deciduous trees, and deciduous shrubs and that riparian conditions in these areas were likely similar to natural conditions. Similar conditions also occur in portions of the North Fork (B. Gamett, personal observation). The condition of this indicator off national forest lands is not known.
	Disturbance Regime	Functioning Appropriately	Natural processes appear to be stable and the subwatershed should be able to quickly recover from natural disturbances (B. Gamett, professional judgment).
Integration of Species and Habitat	Habitat Quality and Connectivity	Functioning at Risk	Stream and riparian habitat appears to be in good condition in most places on the Forest. However, little is known about stream and riparian habitat off national forest lands. The subwatershed is not connected to other streams in the Pahsimeroi River basin due to diversions.

Conditions			

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APPENDIX C – MONITORING DATA AND SUMMARIES

Figure C1 – Spring Gulch Allotment monitoring sites.

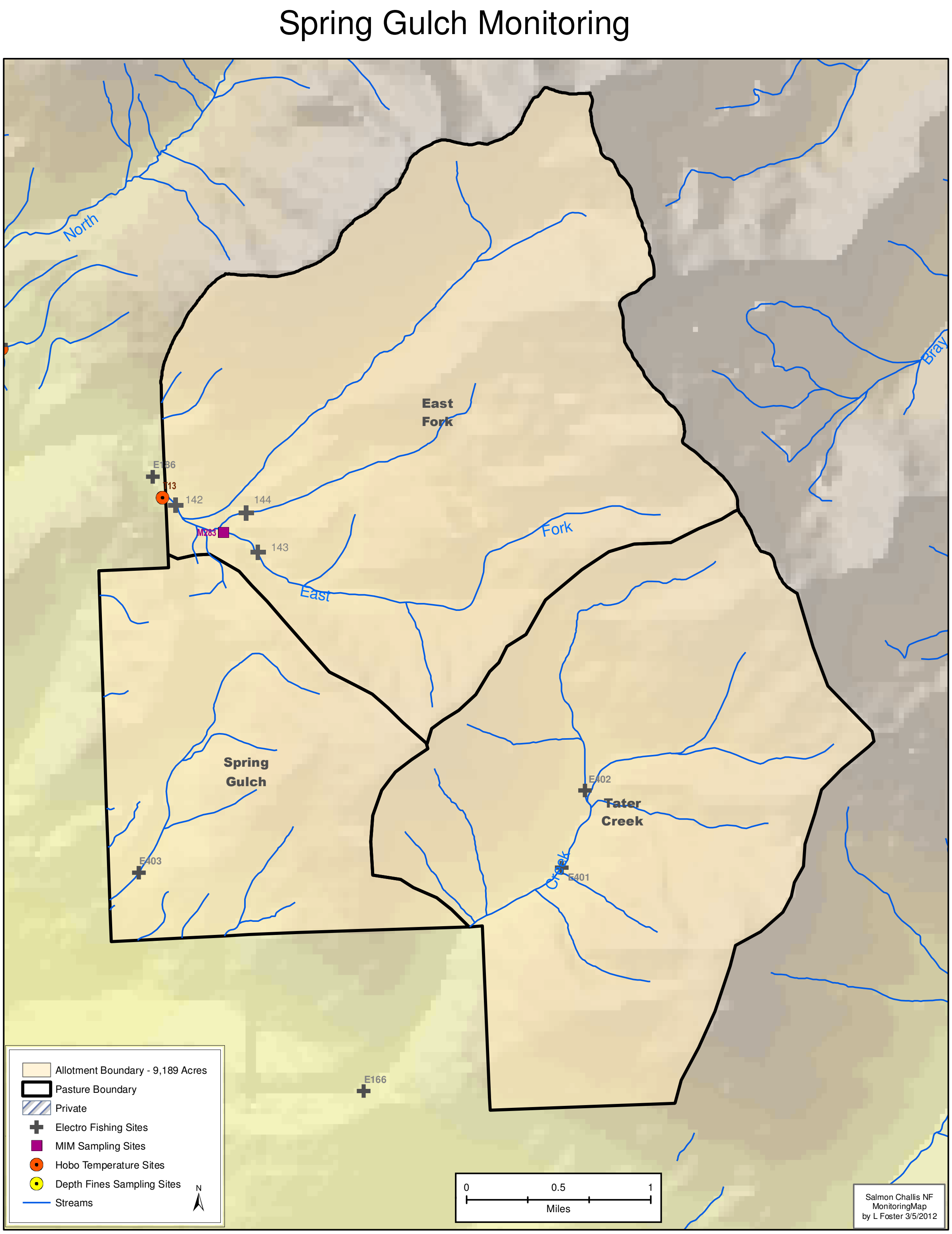

Table C1. Selected data from fish population monitoring sites on the Spring Gulch Allotment (Bartel et al. 2009; Salmon-Challis National Forest, unpublished data).

Stream (Site ID)	**Date**	**Length (m)**	**Mean Width (m)**	**Abundance (Fish ≥ 70 mm/100 m^2)**					
				All Trout	**Rainbow Trout**	**Brook Trout**	**Bull Trout**	**Cutthroat Trout**	**Brook x Bull Trout**
East Fork Morgan Creek (142[A])	6/26/2002	118	4.0	3.2[B]	-	-	3.2[B]	-[C]	-
East Fork Morgan Creek (143[A])	6/26/2002	120	1.7	7.3[B]	-	-	3.4[B]	3.9[B]	-
Unnamed Tributary to East Fork Morgan Creek (144[A])	6/26/2002	100	2.1	7.6[B]	-	-	7.6[B]	-	-
East Fork Morgan Creek (E186[D])	8/3/2009	100	2.7	4.9	-	-	3.0	1.9	-
Tater Creek (E401[D])	8/18/2010	100	1.8	No Fish Observed	-	-	-	-	-
Tater Creek (E402[D])	8/18/2010	100	1.3	No Fish Observed	-	-	-	-	-

[A] These data are from Bartel et al. 2009. The numbers corresponds to those shown on Figure C-1 and the site code shown in Bartel et al. 2009.

[B] A single pass was completed at this site so a population estimate is not available. The value shown represents a minimum estimate based on the number of fish captured in the single pass.

[C] A single cutthroat trout measuring 52 mm in length was collected at this site but because it was less than 70 mm in length it was not included in the abundance estimate.

[D] These data are from Salmon-Challis National Forest, unpublished data. The numbers shown corresponds to those shown on Figure C-1.

Table C2. Bull trout presence, spawning, and proposed critical habitat by stream.

Stream	Bull Trout Present (miles)	Bull Trout Spawning (miles)	Bull Trout Critical Habitat (miles)
East Fork Morgan Creek	1.54	1.54	3.21
Unnamed tributary to East Fork Morgan Creek	0.76	0.76	0.00
Tater Creek	0.00	0.00	2.00
Total	**2.30**	**2.30**	**5.21**

Table C3. Bull trout presence, spawning, and proposed critical habitat by unit.

***Unit*-Stream**	Bull Trout Present (miles)	Bull Trout Spawning (miles)	Bull Trout Critical Habitat (miles)
East Fork Unit Total	2.30	2.30	3.21
East Fork Morgan Creek	1.54	1.54	3.21
Unnamed tributary to East Fork Morgan Creek	0.76	0.76	0.00
Tater Creek Unit Total	0.00	0.00	2.00
Tater Creek	0.00	0.00	2.00
Total	**2.30**	**2.30**	**5.21**

Table C6. Selected stream temperature data from the Spring Gulch Allotment (data are available from the Lost River Ranger District office).

		Temperature		
Stream (Site ID)	Year	Maximum (°C)	7-day Moving Maximum (°C)	Mean (°C) (July 1-Sept 30)
East Fork Little Morgan Creek at Forest Service Boundary (T13)	2009	8.9	8.7	7.3

Table C7. Multiple Indicator Monitoring (MIM) data from the Spring Gulch Allotment (data are available from the Challis-Yankee Fork Ranger District office).

Unit	Stream (Site ID)	Year	Width:Depth Ratio	Bank Stability (%)	Woody Species Abundance			GES[A]	Trend in GES[B]
					Total (#/acre)	Seedling-Young (#/acre)	Seedling-Young (%)		
East Fork	East Fork Little Morgan Creek (M283)	2009	11.7	6	2,909	885	30	24 (ES)	Baseline

[A] Greenline ecological status where 0-15=Very Early Seral (VES), 16-40=Early Seral (ES), 41-60=Mid Seral (MS), 61-85=Late Seral (LS), ≥86 Potential Natural Community (PNC)

[B] Greenline ecological status trend where an increase of 10 points or more is considered an upward trend, a decrease of 10 points or more is considered a downward trend, and a change of less than 10 points is considered a static trend.

APPENDIX D – PROTOCOL FOR MAPPING CHINOOK SALMON CRITICAL HABITAT CURRENTLY DESIGNATED ON THE SALMON-CHALLIS NATIONAL FOREST

PROTOCOL FOR MAPPING CHINOOK SALMON CRITICAL HABITAT CURRENTLY DESIGNATED ON THE SALMON-CHALLIS NATIONAL FOREST

This document summarizes the process that will be used by the Salmon-Challis National Forest (SCNF) to map Chinook salmon critical habitat (CSCH) as currently designated by NOAA Fisheries on the SCNF. Critical habitat has been designated for Snake River spring/summer Chinook salmon and includes "river reaches presently or historically accessible…to Snake River spring/summer Chinook salmon" (Federal Register 58(247):68543-68554). However, this designation did not provide a detailed description of the specific areas included in the designation. Such a description is essential when completing site specific consultations to determine if CSCH is present within the action areas. The purpose of this project is to create a GIS layer that delineates the SCNF's interpretation of specific areas that are designated as CSCH in this rule. It should be emphasized that this process is not to "designate" CSCH but to portray the SCNFs interpretation, using the identified process, of those areas that have already been designated by the rule. For the purposes of the project, we assume CSCH to be all areas currently or historically occupied by Chinook salmon. This process includes only those areas within the administrative boundary of the SCNF.

The process will use the NHD stream layer as the base layer. By default, all streams will initially be considered to not be CSCH. The following steps will then be used to map designated CSCH.

Step 1: <u>Add reaches identified by the Intrinsic Potential Model</u>

An Intrinsic Potential Model (IPM) developed by the National Marine Fisheries Service (Cooney and Holzer 2006) has been used to model potential spawning and rearing habitat within the SCNF. All stream reaches identified by the IPM shall be mapped as CSCH.

Step 2: <u>Remove reaches that were inappropriately identified by the IPM</u>

The IPM has the potential to identify streams or portions of streams where Chinook salmon could not have occurred. This step involves identifying these reaches and removing them from the CSCH layer. Forest fish staff will review stream reaches selected by the IPM and identify those that were inappropriately included. This may include, but not be limited to, stream reaches that are a) ephemeral, b) above natural barriers, or c) too small to support Chinook salmon. Documentation supporting the removal of each stream reach must be provided.

Step 3: <u>Add reaches where Chinook salmon have occurred based on redd data, but have not been identified in previous steps as CSCH</u>

Chinook salmon redd surveys have been conducted by various organizations. These data will be reviewed by Forest fish staff and all sites where Chinook salmon redds have occurred that have not already been identified as CSCH shall be mapped. Documentation supporting the inclusion of each stream reach must be provided.

Step 4: <u>Add reaches where Chinook salmon have been observed during SCNF fisheries assessments, but have not been identified in previous steps as CSCH</u>

The SCNF has conducted various fisheries assessments and resulting data contain site-specific information regarding Chinook presence in streams. These data may include, but not be limited to, a) general fish population assessments, b) fish population monitoring, c) project specific monitoring, d) observation by Forest Service personnel, and e) R1/R4 surveys. These data will be reviewed by Forest fish staff and all sites where Chinook salmon have occurred that have not already been identified as CSCH shall be mapped. Documentation supporting the inclusion of each stream reach must be provided.

Step 5: Add reaches where Chinook salmon have been observed during fisheries assessments conducted by external organizations, but have not been identified in previous steps as CSCH

Various organizations other than the SCNF have conducted fisheries assessments and resulting data are valuable for identifying areas where Chinook salmon have occurred within the SCNF. Such organizations may include, but not be limited to a) the Idaho Department of Fish and Game, b) the Department of Environmental Quality, and c) Native American Tribes. These data will be reviewed by Forest fish staff and all sites where Chinook salmon have occurred that have not already been identified as CSCH shall be mapped. Documentation supporting the inclusion of each stream reach must be provided.

Step 6: Add reaches that may provide or may have provided tributary refugia to Chinook salmon, but have not been identified in previous steps as CSCH

Chinook salmon may occupy portions of tributary streams that are not directly associated with spawning areas. Chinook salmon can encounter water temperature or turbidity conditions that are temporarily less than optimal or are lethal (Torgersen et al. 1999; Scrivener et al. 1993). When this occurs, the fish may move to tributary streams that have more suitable conditions but that the fish would not otherwise occupy. We refer to these areas as tributary refugia.

It is important to know how far Chinook salmon may move up tributary refugia. However, most of the information that we found (e.g. – Scrivener et al. 1994, Malsin et al. 1996-1999, Murray and Rosenau 1989) was not directly applicable to the set of conditions present on the SCNF in central Idaho. Those studies with data most closely representing conditions found in central Idaho show that fish seeking refugia primarily use confluence areas (Strange 2007; Torgersen et al. 1999). Since we were not able to locate information on use-patterns in tributary refugia, we used professional judgment to estimate how far up these tributaries Chinook salmon might move. Based on our review of fish population and stream habitat data from the Salmon River basin, we concluded that Chinook salmon likely do not move more than 0.25 miles up a tributary if the only reason they are in the stream is to seek refugia.

Although the previous steps in this process have likely identified most stream reaches that are tributary refugia, it is possible that some of these areas have still not yet been included. This step allows the addition of tributary refugia using the following set of criteria as a guideline for mapping. Professional judgment shall be used and documentation supporting the addition of each stream reach must be provided.

a) **Proximity to CSCH:** The tributary must connect to a stream or river currently included as CSCH.

b) **Watershed Size:** An evaluation of the smallest tributaries where Chinook salmon presence was confirmed within the SCNF can be useful in estimating the lower limits to watershed size constraining use of streams by Chinook. The average lower limit to watershed size where Chinook were present or presumed likely to use as refuge on the South Zone of the SCNF was approximately seven square miles. This value or a value that is appropriate for a given geographic area may be used to identify tributaries where it is reasonable to assume that Chinook salmon can access and use as refuge.

c) **Fish-Bearing Streams:** Streams accessible to other salmonids can reasonably be assumed to be accessible to Chinook. Tributaries that contain other salmonids and are not smaller that the lower limit to watershed size shall be considered for inclusion as CSCH for 0.25 miles upstream from the confluence. Tributaries meeting this criterion, but exhibiting barriers to migration at the confluence shall be considered for exclusion from CSCH.

d) **Non-Fish-Bearing Streams:** Streams inaccessible to other salmonids can reasonably be assumed to be inaccessible to Chinook and shall generally be considered for exclusion from CSCH.

* Streams lacking fish occurrence data shall be evaluated for inclusion in or exclusion from CSCH based upon the watershed size and professional judgment.

Step 7: Add reaches that, based on professional judgment, may be currently or may have been historically occupied by Chinook salmon, but have not been identified in previous steps as CSCH

It is possible that the previous steps have not identified all reaches that either currently contain or historically contained Chinook salmon. This step allows Forest fish staff to use professional judgment to identify any additional CSCH that may have been missed in the previous steps. Documentation supporting the addition of each stream reach must be provided.

Step 8: Add reaches that are downstream from CSCH identified in the previous steps

Since Chinook salmon migrate to the Pacific Ocean, they will occur at least seasonally in all areas downstream of the stream reaches identified as CSCH in the previous steps. Therefore, all reaches downstream of areas identified in the previous steps as CSCH shall also be mapped as CSCH.

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APPENDIX E – BULL TROUT CONSTITUENT ELEMENTS OF CRITICAL HABITAT

Primary Constituent Elements of Critical Habitat

The Forest has utilized six “Focus Indicators” to characterize the condition of the habitat for listed fish species on streams within allotments on the Salmon-Challis National Forest. These are: 1) spawning and incubation, 2) temperature, 3) sediment, 4) width: depth ratio, 5) streambank condition, and 6) riparian conservation areas. These indicators also serve to form the basis for potential impacts to the Primary Constituent Elements (PCEs) for Chinook salmon, steelhead and proposed bull trout critical habitat.

The following are the specific PCEs for the proposed bull trout critical habitat (January13, 2010, Federal Register 75FR2270) and examples of habitat indicators that can be used to assess the condition of the PCEs. Many of the Forest “focus indicators” match the examples (highlighted in the Associated Habitat Indicators). They have been thoroughly addressed within the environmental baseline conditions and the site specific effects analysis. Therefore, they form the basis for the Forest’s determination for effects to the species and potential critical habitat.

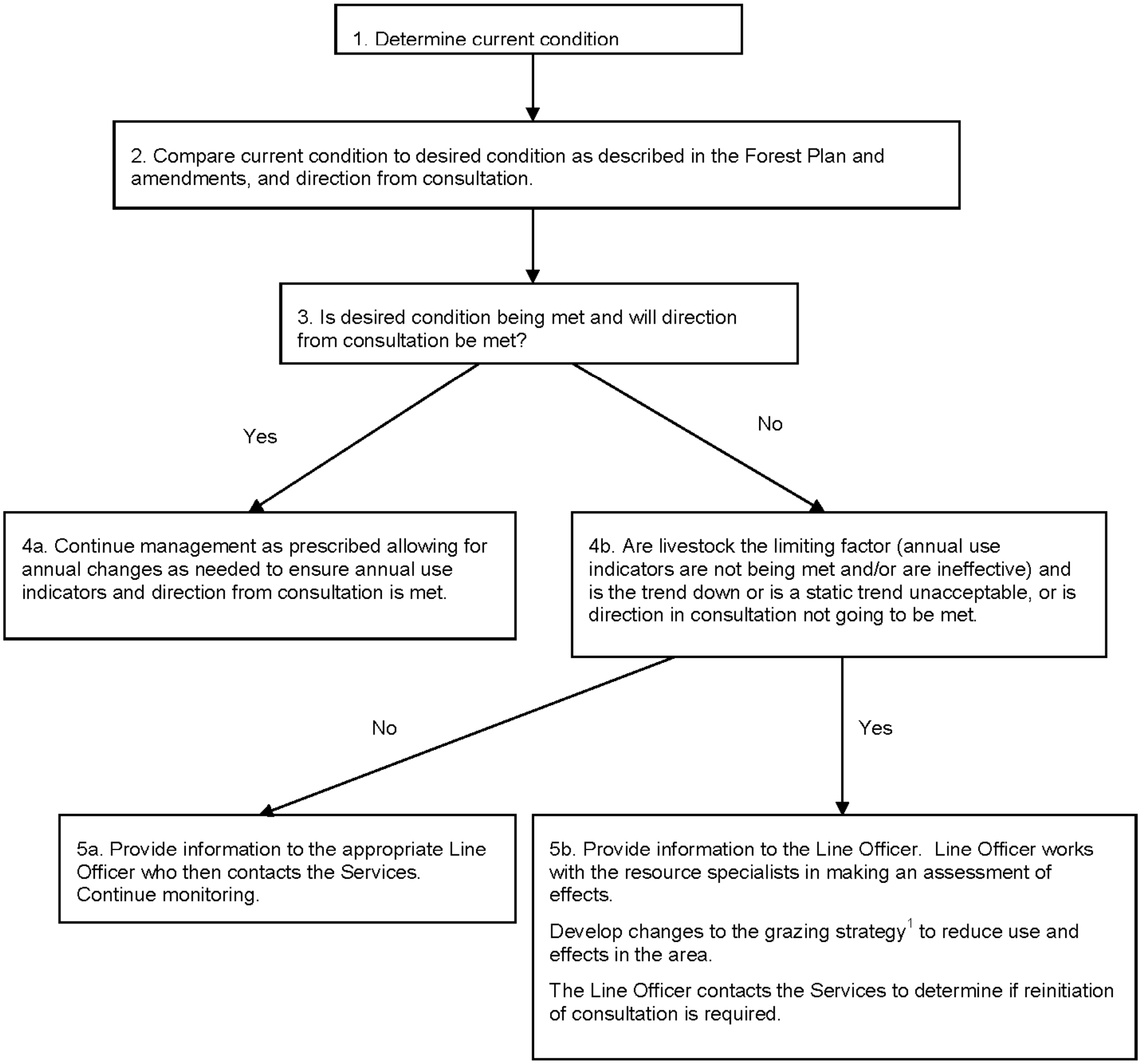
Primary Constituent Elements for Proposed Bull Trout Critical Habitat and Associated Habitat Indicators

PCE #	PCE Description	Associated Habitat Indicators
1.	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporehic flows) to contribute to water quality and quantity and provide thermal refugia.	floodplain connectivity, change in peak/base flows, increase in drainage network, **riparian conservation areas**, chemical contamination/nutrients
2.	Migratory habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.	life history diversity and isolation, persistence and genetic integrity, **temperature**, chemical contamination/nutrients, physical barriers, **average wetted width/maximum depth ratio in scour pools in a reach**, change in peak/base flows, refugia
3.	An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.	growth and survival, life history diversity and isolation, **riparian conservation areas**, floodplain connectivity (importance of aquatic habitat condition indirectly covered by previous seven PCEs)
4.	Complex river, stream, lake, reservoir, and marine shoreline aquatic environments and processes with features such as large wood, side channels, pools, undercut banks and substrates, to provide a variety of depths, gradients, velocities, and structure.	large woody debris, pool frequency and quality, large pools, off channel habitat, refugia, **average wetted width/maximum depth ratio in scour pools in a reach**, **streambank condition**, floodplain connectivity, **riparian conservation areas**
5.	Water temperatures ranging from 2 to 15 °C (36 to 59 °F), with adequate thermal refugia available for temperatures at the upper end of this range. Specific temperatures within this range will vary depending on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shade, such as that provided by riparian habitat; and local groundwater influence.	**temperature**, refugia, **average wetted width/maximum depth ratio in scour pools in a reach**, streambank **condition**, change in peak/base flows, **riparian conservation areas**, floodplain connectivity
6.	Substrates of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount (e.g., less than 12 percent) of fine substrate less than 0.85 mm (0.03 in.) in diameter and minimal embeddedness of these fines in larger substrates are characteristic of these conditions.	**sediment**, **substrate embeddedness**, large woody debris, pool frequency and quality

7.	A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, they minimize departures from a natural hydrograph.	change in pea k/base flows, increase in drainage network, disturbance history*, disturbance regime (* Information relative to disturbance history is often found in the baseline narrative)
8.	Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.	**sediment**, chemical contamination/nutrients, change in peak/base flows
9.	Few or no nonnative predatory (e.g., lake trout, walleye, northern pike, smallmouth bass; inbreeding (e.g., brook trout); or competitive (e.g., brown trout) species present.	persistence and genetic integrity, physical*barriers* (* Information relative to disturbance history is often found in the baseline narrative)

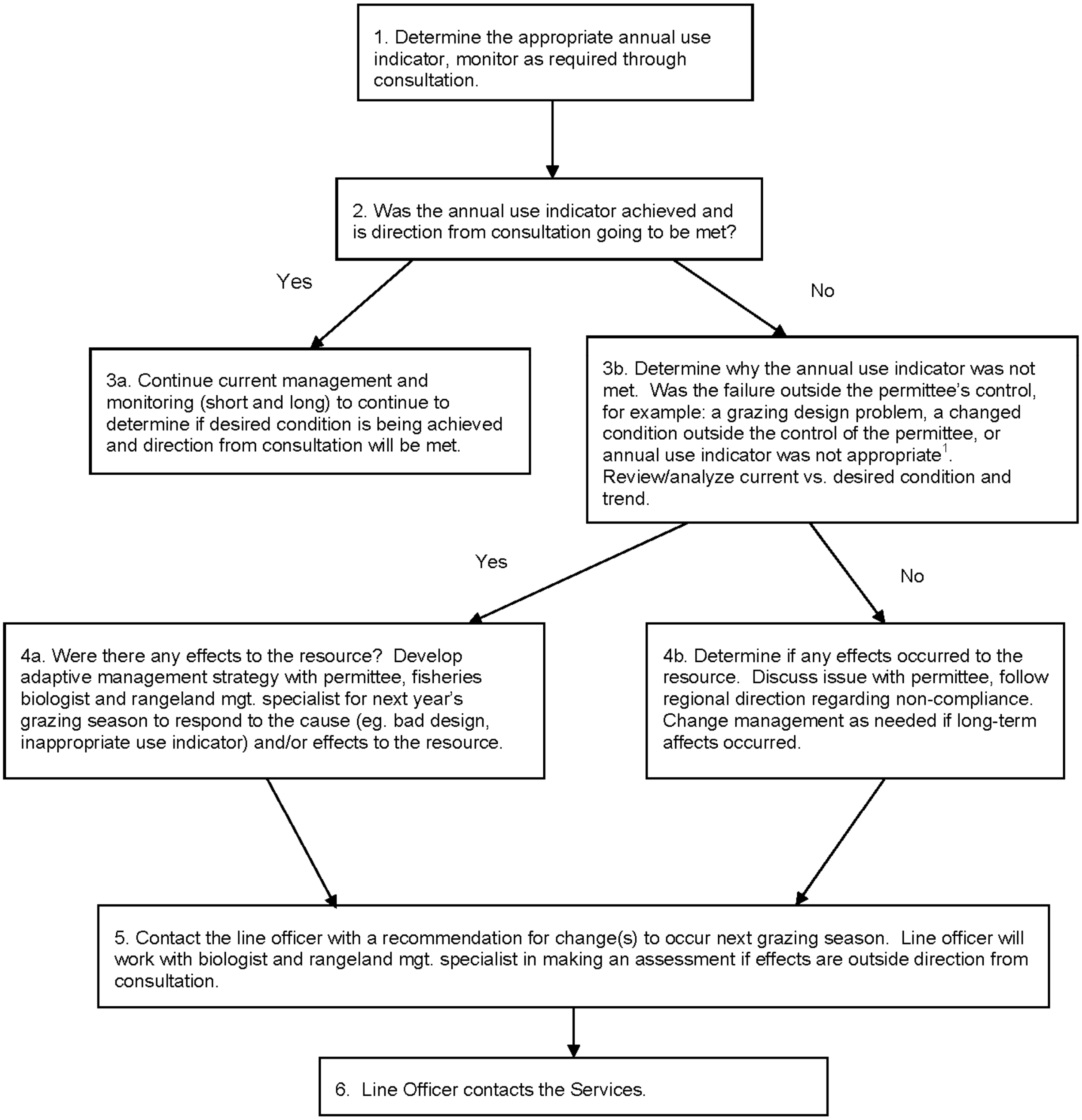
APPENDIX F – ADAPTIVE MANAGEMENT DIAGRAMS

Diagram 1.0 – Implementation of Long-Term Adaptive Management Strategy for Allotments Requiring Consultation.



[1]Management actions will initially reduce use in the area. It is expected this may occur in any number of ways including but not limited to changing the season of use, reducing numbers, changing amount of use on annual indicator, changing herding practices, changing salting practices and/or reconstructing/constructing range improvements. If use can't be reduced and livestock continue to be the limiting factor total removal of livestock from the area may be necessary. Effectiveness of changed management will be monitored through adjusted annual use indicators and effectiveness monitoring.

Diagram 2.0 - Implementation of Annual Adaptive Management Strategy for Allotments Requiring Consultation.



[1]An inappropriate annual use indicator is an indicator that does not most accurately identify the weak link or first attribute that would indicate excessive livestock impacts. In this situation, changing to a more appropriate indicator will help achieve or maintain desired conditions.